THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXXII. No. 4. Whole No. 1,546. | NEW YORK, MONDAY, JANUARY 23, 1905. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $5 (£1—25 francs). All payments to be made in advance. Single copies, 10 cents.

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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Thirty-fifth Annual Meeting, New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
EAST BOSTON, MASS., Jan. 10, 1905.

To the Members of the New England Association of Gas Engineers: The Thirty-fifth annual meeting of the New England Association of Gas Engineers will be held at Young's Hotel, Boston, Wednesday and Thursday, February 15th and 16th, 1905. Those of our members who have changed their addresses will confer a favor on the Secretary by notifying him of such changes, so that they may have proper notification of the meeting.

Queries for the Question Box at the meeting should be forwarded at once. Respectfully, N. W. GIFFORD, Secretary.

[OFFICIAL NOTICE.]

Respecting the Official Work of the American Gas Light Association.

AMERICAN GAS LIGHT ASSOCIATION,
SECRETARY'S OFFICE,
530 Broadway, N. Y., Dec. 13, 1904.

To the Members American Gas Light Association: As there seems to be some misunderstanding respecting the standing of the official management of the Association, members will please note that the undersigned is the Secretary of the Association, and that Mr. A. E. Forstall is carrying forward the work of the Practical Class. All correspondence in connection with the Practical Class should therefore be addressed to Mr. A. E. Forstall, 58 William street, and all other matter pertaining to the Association to MR. GEORGE G. RAMSDELL, Secretary, at the above address.

[OFFICIAL NOTICE.]

Wrinkle Department, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF SECRETARY,
DELAWARE, O., Nov. 21, 1904.

The Editor of the Wrinkle Department, Mr. E. E. Eysenbach, General Manager of the Binghamton (N. Y.) Gas Company, earnestly solicits the co-operation of the fraternity for contributions to be presented to the Twenty-first Annual Meeting of the Association, which is to be held at the Hotel Schenley, Pittsburg, Pa., March 15th, 16th and 17th, 1905.

Editor Eysenbach will be pleased to receive contributions not later than February 10th. Work for the good of the cause and send him your "Wrinkles." T. C. JONES, Secretary.

[OFFICIAL NOTICE.]

Novelty Advertising and New Business Methods Department, Ohio Gas Light Association.

SECRETARY'S OFFICE,
DELAWARE, O., January 16, 1905.

The Editor of the Novelty Advertising and New Business Methods Department, Mr. B. W. Perkins, of South Bend, Ind., desires to announce that his department is now open for contributions to be presented at the Twenty-first Annual Meeting, which is to be held at the Hotel Schenley, Pittsburg, Pa., March 15th, 16th and 17th, 1905.

The sale of gas is one of the most important branches of our industry and this department is one of the most attractive features of the convention. It is, therefore, earnestly hoped that the fraternity will heartily co-operate with Mr. Perkins, and send him advertising and new business method schemes. T. C. JONES, Secretary.

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[Official Notice.]

Bureau of Information, Ohio Gas Light Association.

City of Lincoln Gas Co.,
Lincoln, Ills., Oct. 10, 1904.

To the Fraternity: At the last meeting of the Ohio Gas Light Association a Bureau of Information was decided upon, the idea of which is to render assistance to members who may have questions coming up or difficultles arising respecting which they would like some help. This Bureau has been established and is now ready for business. A number of co-Editors have been appointed to whom the various questions will be referred. As this is the first Bureau of Information attempted by any Association, it is hoped that the members will take advantage of its opportunities. The co-Editors are as follows:

Distribution.—E. E. Eysenbach and M. E. Malone.
Accounts and Bookkeeping.—D. W. Low and Chas. Ritter.
New Business and Gas Appliances.—Frank D. Moses, Ralph Woodward and F. Cavanagh.
Chemistry.—H. B. Harrop and Clarence Lomax.
Retort House.—Moses Coombs.
Natural Gas.—W. H. Hammon and Geo. W. Barnes.

All questions should be addressed to the Editor, at Lincoln, Ills.

Very truly yours,
H. L. Olds, Editor Information Bureau.

BRIEFLY TOLD.

Notes.—

Mr. L C. Hamlink, well known to the builders of gas retort work in this country, has been employed by the Fred. Bredel Company, of Milwaukee, Wis. He will travel in its interest.

"P.," writing from Chicago under date of the 18th inst., says: Dear Journal: Evidently our gas friends in Chicago, and in fact all through Illinois, are in for a good warm time. This onslaught has been expected, and without doubt our friends are ready to give the guerillas a battle royal. That which leads to these thoughts may be found in the following history of the bill introductions made in the Illinois Legislature, "sitting" as usual in Springfield, to-day. S. E. Erickson put in the first one. It provides that the price of gas of 16-candle power, shall not be greater than 75 cents per 1,000 cu. ft. anywhere in Illinois. It gives the gas company the right, however, to appeal to the Circuit Court for a ruling as to whether the price would give it a fair return on its necessary investment. Representative McGoorty followed with two bills prepared by the city administration of Chicago. One of them gives the City Council the right to fix the price of gas, with the same privilege of appeal by the Gas Companies to test the question as to the rate being a reasonable one. The other is a municipal ownership bill pure and simple, practically on the lines of the Mueller bill of the last session, except that gas, electric light, and heating and power plants are specified instead of street railroads. Representative Lurton put in the other municipal ownership bill for gas and electric light plants. It differs from the McGoorty bill in that it not only gives the cities the right to manufacture and sell gas, but adds, "and may fix the maximum compensation to be charged by any private corporation to its citizens." All went to the committee on municipal corporations when it is formed.

The Connecticut Railway and Lighting Company, through Superintendent Wainwright, denies the report that it will extend its gas mains from the Norwalk plant for the supply of the residents of Westport.

The Directors of the Newport (R. I.) Gas Company have perfected the following organization: President, Melville Bull; Secretary, Thomas A. Lawton; Treasurer, Andrew K. Quinn.

The Fall River (Mass.) Gas Works Company has declared a semi-annual dividend of 5 per cent., payable the 1st prox.

Messrs. John Cushman and C. W. Morse, of Haverhill, Mass., have purchased the holdings of the other members in the ownership of the Marlboro-Hudson (Mass.) Gas Light Company. The turnover will mean no change in the methods and personnel of those who have been operating the plant.

The plan for a new gas plant at Jackson, Miss., seems to be taking definite shape. The main spirit in the enterprise is Mr. C. A. Bonds.

The Kansas City, Missouri, Gas Company paid into the city treasury some days ago the sum of $10,061.05, which amount represents 2 per cent. on its gross receipts for the 6 months ended the 1st inst.

At the annual meeting of the Hartford City (Conn.) Gas Light Company the officers elected were: Directors, E. B. Bennett, George Roberts, John T. Robinson, Francis R. Cooley, James H. Knight, Sylvester C. Dunham, John R. Hills, S. B. Bertron and R. S. Storrs; President, E. B. Bennett; Vice-President, S. R. Bertron; Treasurer and General Manager, R. E. Slade; Secretary, J. A. McArthur; Assistant Secretary, John T. Robinson.

Modern Lamps, Jets and Lighting Apparatus for New Japan.

[Prepared for the Journal, by "R."]

Information comes from Japan that as soon as the present war ceases there will be an innovation in the lighting facilities as well as in other branches of industry, trade, art and science. Since the beginning of the war considerable property has been absorbed in the war apparatus. Machine shops, wood-working establishments and artisans in general have diverted their time and labor from the usual line of work to apply it where more needed at the present time; in fact, artisans who were engaged in making devices for household purposes have been put on war materials. The result has been that the stocks of general furnishings are quite depleted. Among those are the lighting devices. Japan never was very well advanced in either street, office, hotel, public building or private dwelling lighting. The common taper dip in oil may be seen in service anywhere. The writer spent considerable time travelling in Japan at the outbreak of the present war. In some of the first-class houses of Nagasaki I saw the most inferior descriptions of lamps for lighting purposes. This was nearly a year ago, and then I met with agents introducing the American system of acetylene lighting. I saw systems of vapor lights in which the vapors were burned on mantles with considerable brilliancy. There were also various types of electric lights put in. The latter, however, are confined to the large cities as a rule; very few of the common folks use them.

The Japanese incline towards the artistic in their lights. Very frequently I saw the commonest forms of lighting apparatus richly decorated. Often the simplest description of candle or oil light is so richly ornamented in bronze work that it is really pleasant to look upon. Sometimes the common tallow dips are fitted out in expensively made sockets and stands. The annexed illustrations will give an idea of the character of some of the lighting apparatus seen by your correspondent while travelling in the land of the moon-eyed folks. Fig. 1 shows the way in which a lamp is suspended—the Japanese delight in hanging out lights. They want brackets and other devices which they may fasten to the wall work of the house front and to this secure the light; therefore, American manufacturers, in endeavoring to meet the requirements of the people of the far-East will find it to their advantage to introduce types of lamps and lamp fixings of an elaborate order. When it comes to tools with which to work, the Japanese want the very simplest types; but when it comes to lamps and lamp stands, they look for something carrying more or less artistic design work. Even the plain, cast iron metal brackets may be seen in service in Japan for suspending lamps. Instead of using these imported metal brackets for shelves, the Japanese often utilize them against the walls of their room, to hang a lamp on. In the illustration, Fig. 1, the lamplight is obtained by burning Japanese fuses on the 3-cornered metal plate, as at *A*. This casts a flickering, unsteady and unsatisfactory light. I noticed that almost every household burned a light constantly.

Usually a small oil lamp with heavy glass globe shade of small size is employed and the light is very low. Fig. 2 is another design of lamp noticed in service by the writer in the private rooms of a merchant. The framework supporting the affair, shown at *B*, is entirely metal and was wrought out of American strips of material, about 1½ inches wide, and ⅜ inch thick. The strips, bent to the required pattern on a form, the parts were then riveted together, forming the frame as shown, to which the cage like device, *B*, is fixed.

This cage contains in it a composition of stuff which when heated gives forth an odor which is stifling to the American, but apparently soothing and pleasing to the Japanese, for he falls asleep under the influence of the "stuff." It is harmless. The light is from a bulky device below, as shown. One sees some American signs in the land of the Japanese now, indicating the carrying in stock of lamps manufactured in the United States. Fig. 3 is a drawing of one of these signs. American lamps have been on sale in the larger cities and towns of Japan for some years. Recently the demand for these lamps has improved, but, as before indicated, the Japanese look for something more than the plain lamp for lighting purposes. The fact that it gives forth a brilliant light is no reason why the proposed customer should buy. If, however, the lamp is made up in such a way as to appeal to the Japan ideas of the artistical in design, the chances are that the lamp will sell readily. Fig. 4 shows a plan of a type of lamp that for example suited one man. It was "made in Germany," and consisted of the traditional metal frame, constructed from bent pieces of wrought iron, riveted and painted. Along the center of the frame the seat is fixed to carry the row of lamps.

Just why anyone would require so many lamps cannot be explained, but the form of lamp pleased the customers greatly. Then, again, the buyer of lamps in Japan has a liking towards those put up in the manner portrayed in Fig. 5. It consists of a stand or upright made of metal, fixed to a platform for support, or arranged with the necessary attachment for connection to a wall or post. Then there is hung to the end of the hook the single lamp, as shown. These lamps are used for hall work, for lighting porches, etc. Still auother form of lamp seen by your correspondent is shown in Fig, 6. It was used in a home where they had an electrical connection. The house was lighted with electric lights set up on stands of the order shown in the cut. Instead of the wires running through the walls and pipes to light certain rooms, a number of these stands were set up about the halls and rooms and connected by wiring, so that the lamp fixed at the top, as at *C*, could be lighted. Just the plain lamp itself would have no attraction for the "proud" householder. He must have his lights set up on monuments, so as to be attractive to the last. Fig. 7 shows another

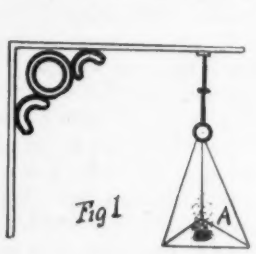


Fig 1

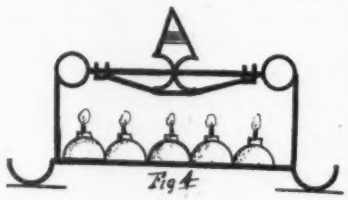


Fig 4

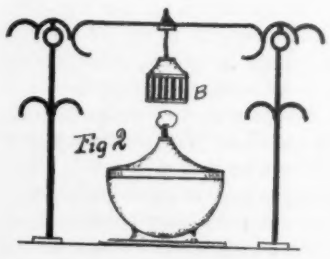


Fig 2

Fig 3

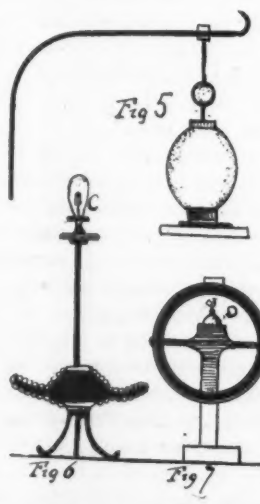


Fig 5 Fig 6 Fig 7

odd type of lamp that I saw. This, like the others, is on a stand, except that wood is used in the making of the latter. It is of hard wood, nicely finished. There is a queer ring attached, as shown, while the lamp itself is adjusted to the top of the wood base, as at *D*. The mission of the ring I could not ascertain. It is expected that as soon as the war ceases, considerable American designed lamps and lighting devices will be shipped into Japan. One may find agencies in all the leading cities for different types of calcic carbide, house lighting devices, oil lighting improvements, gasholders, electric lighting apparatus, etc. Some of these agents are carrying the American products almost exclusively. The writer, having had an opportunity to consult with some of these men, was told that the Japanese had a preference for the American lighting devices, and no doubt would prove this by installing new systems of lighting in offices, homes, shops, hotels and public buildings as soon as the present difficulties cease.

The Latest German Form of Vertical Retort Setting.[1]

Making Gas "Entirely Free from Naphthaline."—As is well known experiments have for some time past been carried out in certain German gas works with various arrangements of vertical retorts; but no details have so far been forthcoming as to the results attained. Considerable interest will consequently attach to one of the specifications issued last week by the English Patent Office—No. 1,393, dated Jan 19, 1904—taken out in the names of the Deutsche Continental Gas Gesellschaft and Dr. Julius Bueb, both of Dessau. The invention is described as relating to the manufacture of illuminating gas from coal, and consisting in "an improved method of distilling coal, whereby gas is obtained from the retorts entirely free from naphthaline, and a liquid tar is produced while the amount of apparatus and labor, and consequently the cost, are reduced."

1. *Journal of Gas Lighting*

The patentees claim as their invention: "The manufacture of gas by subjecting coal to distillation in a vertical retort heated to a higher temperature than is usually employed in gas manufacture, so that coke is formed from the internal walls of the retort inwards, and the gas generated passes inwards and upwards through the central portion of the charge; the retort being charged with coal up to the same level as that up to which the external heat is applied, so that no space is left in which tar can quickly separate—it being compelled to pass up through the uncoked internal portion of the charge before leaving the retorts."

They say: "It is well known that, making coal gas as hitherto practised, a great inconvenience is that the gas obtained contains a considerable amount of naphthaline, which requires to be removed from the gas before it is ready for use; and its removal necessitates a considerable amount of apparatus, labor, and expense. Another inconvenience is that tar which is produced simultaneously with the gas contains a considerable amount of carbon of which not only is the gas deprived, but it reduces the value of the tar and occasions objectional thickening of the tar in the receptacle, or condenser, and such tar interferes with, and greatly disturbs the work. This invention avoids these objections; the gas as manufactured leaving the retorts free from naphthaline, and the tar carried along with the gas being substantially free from carbon proper, and being a liquid oil technically pure, instead of being a semi-liquid mass difficult to handle and interfering with the work."

The invention is based upon trials and experiments by which it has been found that the formation of naphthaline does not necessarily follow, or accompany, the separation of the gas from the coal, but takes place as soon as the heavy hydrocarbons contained in the gas distilled from the coal are heated beyond a certain temperature, and, further, that the tar rich in carbon, is only produced if the oils forming its chief part are, immediately after their formation, separated from the coal from which the gas is taken off, and are allowed to take up and carry off the smoke, or carbonaceous dust, produced in the gasification.

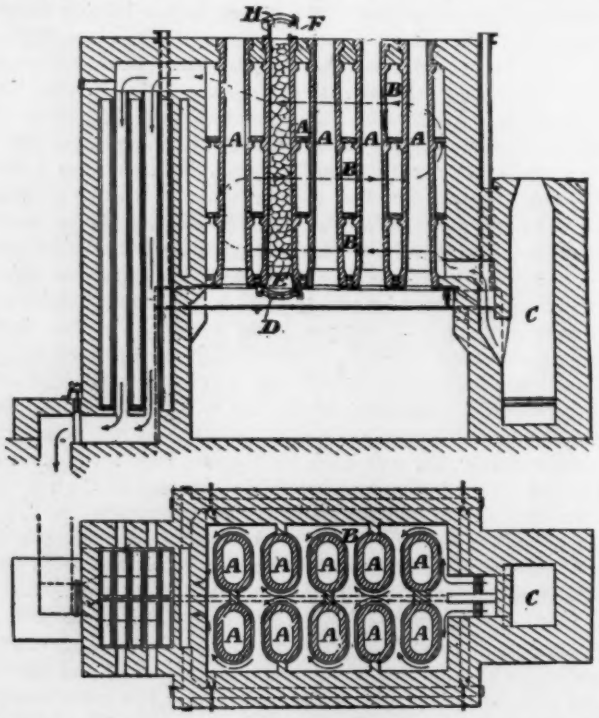
As already mentioned, it is proposed to employ vertical retorts; and the free spaces hitherto left in the retorts for collecting the gas arising from the coal before the gas is discharged into the receptacle or condenser are dispensed with. The retorts have preferably an oval cross section, and are made uniformly taper—their narrower parts being uppermost. Their height is preferably at least 5 times their breadth at the bottom. They are disposed in an oven, so that the gases by which they are heated pass around them in several superposed zones, in the lowermost of which the temperature is the highest. The retorts are open both top and bottom, and are fixed tightly in the bottom and top plates of the oven. They are provided at the top with a hopper or other device for the introduction of the charge, and with a gas outlet; and they are provided at the bottom with a horizontal shutter or similar device. They are at all times kept full of coal to a level corresponding to that which the surrounding fire reaches; and the bottom of the retort and of the furnace should be at, or about the same level.

The retorts are first heated to a very high temperature (higher than that employed ordinarily in distilling coal), and then they are filled with coal while maintaining the temperature and the heating is continued—care being taken that the retorts remain filled, or nearly so. Owing to the great heat, gas is quickly generated from the portions of the coal in contact with the internal surfaces of the retorts; and such portions are at once converted into compact coke, "which is impermeable to the gas generated." The gas therefore passes from all points of the periphery inwards and upwards through the uncoked, and easily permeable, portions of the charge. By the passage of the gas through the inner uncoked and cooler parts of the charge, the temperature of the gas is prevented from rising beyond the limit at which the heavy hydrocarbons of the gas would be decomposed into naphthaline. The crust of coke formed around the interior of the retort completely protects the gas from contact with the highly heated walls of the retorts. The gasification continues, and the thickness of the annular crust of compact coke gradually increases, so that the diameter of the uncoked vertical core of the coal continually decreases until the whole of the charge has been subjected to gasification and has become coked. There being no space in which the tar can quickly separate from the coal, it is compelled to pass upwards through through the uncoked internal portion of the charge before leaving the retorts, "so that the smoke and carbonaceous dust mechanically carried in the tar are retained and afterwards subjected, with the remaining coal, to gasification." As the tar oils are not under these circumstances decomposed, they escape, in the form of condensable vapors (free, or nearly free, from carbon proper) to the hydraulic main, where they are collected as a liquid oil poor in carbon.

In view of the upwardly diminishing area of the retorts, to insure the

formation of the annular crust of coke as uniformly as possible throughout the entire length of the retorts, the external flues for heating the retorts should be so arranged that the upper and narrower parts of the retorts are less heated than the lower and broader parts, whereby the thickness of the crusts of coke formed on the internal surfaces of the retorts gradually diminishes from the bottom to the top.

In the accompanying vertical longitudinal section and sectional plan,



A are the retorts open both top and bottom; the narrower parts being uppermost. *B* are three sets of superposed flues by means of which the retorts are externally heated. The heating gases pass from a producer *C* into the flues—their course being indicated by dotted lines and arrow heads. The retorts are closed at their bottom ends by covers *D* provided on their inner side with projections *E*, the purpose of which is to insure that the lower end of the charge of coals shall always be above the lowermost end of the retort body—*i. e.*, on a level with the bottom plate of the oven. The top part of each retort is sumounted by a mouthpiece *F* provided with a gas outlet and a cover *H*. In filling the retorts, the bottom covers *D* are first closed; the covers *H* opened, and the charges of coal introduced through the mouthpieces *F*. When the retort is full, the covers *H* are closed and the gasification begins at once.

The gas produced does not, it is said, contain naphthaline, or at most only traces of it. The best illuminating gas hitherto produced, it is pointed out, causes a solution of picric acid to quickly become turbid by reason of the formation of picrate of naphthaline; but after passing the gas produced according to this invention for several days through a solution of picric acid, the solution will not show any turbidity. The tar produced. it is mentioned, shows neither the characteristic black colos, nor the semi-liquidity of the tar produced in the ordinarv manufacture of illuminating gas, and is in "the entirely new form of a brown liquid oil which does not thicken in the hydraulic main, and is very easy to work for obtaining its valuable constituents." Not only is the gas equal to the best illuminating gas produced by other known processes, but the yield is said to be greater, because the carbon particles which have hitnerto been taken up by the tar are retained and subjected to gasification. Moreover, much less apparatus is required, and there is a great saving in labor; the coke obtained is also more compact.

Acetylene Gas Lighting in France.

As soon as it became possible to produce acetylene commercially, the belief that it would supersede to a large extent both coal gas and electric lighting rapidly gained ground, and a number of hydro electric works were put down in the Alps district for the production of calcium carbide. The first period in the life of this new illuminant was one of exaggerated enthusiasm; it lasted for a comparatively short time, and was succeeded almost immediately by a period of unjust and unwarranted indifference, during which several of the works above referred to had to modify their plant for other manufactures. Thanks to the energy displayed by the Union Française des Acétylènistes, an association of manufacturers interested in its development, the use of this gas is on the increase again for the lighting of towns, private dwellings and factories.

The production of aretylene commenced to gain importance in France as an industry in 1896; the development in its use was, however, repeatedly checked in the early days by accidents, due mostly to inexperience in the handling of the new substance. In the 6 years from 1896 to 1902 no less than 2,350 patents were granted in France dealing with the production and utilization of acetylene. In 1897 the Government decided to place in the third class of risks the installations for acetylene gas lighting, when the capacity of the same did not exceed 1,000 liters (45.3 cubic feet). In this class they were grouped, with reference to risks, among the "dangerous and insalubrious installations," which may be put down in close proximity to dwelling houses, after due authorization from the municipal authority, and without any previous canvassing to ascertain the opinions of the neighbors. When the above volume was to be exceeded, the municipality, before granting the authorization, had to ascertain that the installation would not cause any prejudice to the neighbors or lead to claims on their part. These conditions still rule, and when it is intended to use acetylene in any dwelling or premises, an application in duplicate must be sent to the prefect of the department, with a plan, in 3 copies, showing both the premises and the surrounding houses within a radius of 100 meters (328 feet), together with a drawing of the gas generator proposed. Very few firms, or private persons, have troubled to obtain the required authorization and to go through the formality required by law; in fact, it is stated that of the 40,000 installations now in use in France barely one-sixth are authorized. It would appear, therefore, that the association above referred to, part of whose programme is to obtain less stringent legislative methods with regard to acetylene, has but little trouble under this head. That it has been possible to ignore so very largely the rules and regulations applicable to this new illuminant would prove that it can be used with a great margin of safety.

The fire insurance companies at first enforced very stringent conditions for fire risks in conjunction with acetylene, but they have agreed since that no extra premium shall be charged by reason of use of acetylene, provided that the gas producers and the store of carbide are placed outside the insured buildings. The premium for insurance is much higher when the gas producers are placed within the buildings; in this case they have to be fitted up in a carefully ventilated room; under no circumstances are they to be placed in a cellar or in a space which gives into a dark and imperfectly ventilated courtyard. The store of carbide is to be contained in a metallic chest in a dry place.

When the double jet, air draught burners came into use, 4 townships in France decided in favor of acetylene for lighting. One of these, La Clayette, in Saône-et-Loire, laid 4,000 meters (4375 yards) of gas pipes for serving a population of 1,600 inhabitants. The lights number 300 including 50 for street lighting. The concessionaire company sells the gas to the municipality at the rate of 3 france per cubic meter, the rate to private consumers being 3.50 francs ($17.25 and $20 per 1,000 cubic feet). These prices are approximatels those which rule at the present day.

The consumption of carbide was 4,500 tons in 1898. It has since increased annually to 8,500, 10,500, 12,000 and 14,500 tons in 1902-3, the latest year for which figures are available. The display of acetylene gas lighting at the Paris Exhibition of 1900 was not a very important one; two works only exhibited. The permission which was granted in 1901 for lighting an agricultural show with acetylene gas, and the greater facilities conceded by the railway companies for the carriage of carbide, aided in the development of the production. A further incentive was afforded by the improvements which were regularly being carried out in the apparatus, and by the invention of the oxi-acetylenic blow pipe. On the other hand, and, unfortunately, from the point of view of a greater development in the use of this comparatively new substance, the contractors who in France undertake to put down acetylene gas lighting installations are legion, and a very great proportion of these contractors have but vague ideas as to the conditions that have to be fulfilled in order to secure safe and adequate working. In many cases the customers experience difficulties, and the onus falls on the acetylene. As a rule, automatic apparatus are used for private lighting; in other installations, carbide-to-water, water rising and dipping generators are used in approximately equal numbers. Water-to-carbide apparatus are rarely met with. The pressure generally reckoned upon lies between 6 and 20 centimeters (2.36 inches and 7.87 inches) of water, though it sometimes reaches 60 and 75 centimeters (23.62 inches and 29.52 inches). Portable apparatus rarely give satisfactory results, although a number of different types are in frequent use for motor cars and for the lighting of yards and works in the

open. The street lighting devices also give much trouble with reference to cleaning and re-charging. The use of acetylene in mining lamps seems to be increasing largely. Multiple-jet burners with air draught are mostly used; incandescent lighting is rarely met with, both because *purification of the gas has hardly been resorted to so far*, and because the illuminating power of the naked jet is sufficient for all practical purposes.

The problem of heating by the combustion of acetylene gas has led to the invention of numerous types of stoves, in which the connections are mostly formed of flattened tubes starting from an acetylene and air receiver. There are also in the market soldering irons in great variety heated by acetylene gas. The blowpipes referred to above are being developed largely; they yield a temperature of at least 3,000° (5,432° F.) for an average proportion of 100 to 150 liters (3.5 to 5.3 cubic feet) of oxygen per 100 liters (3.5 cubic feet) of acetylene.

There are 112 towns in France which are lighted by acetylene; these are mostly small towns, with a population not exceeding 5,000 inhabitants. The gas pipes are mostly of lead. For a town in which there are probably 6,000 meters (6,500 yards) of piping, the pipes laid from the gas generator over a length of 1,500 meters (1,650 yards) would be 80 millimeters (3.14 inches) in diameter; the diameter would be reduced to 50 millimeters (1.96 inches) for the following 1,650 yards, and to 40 and 30 millimeters (1.57 inches and 1.48 inches) for the remainder. The branch pipes for the street lights are also of lead, 13 millimeters (0.51 inches, in diameter; those to private dwellings are also 0.51-inch pipes, except when the jets are numerous, in which case pipes 20 millimeters (0.78 inch) in diameter are laid. In these towns the generators are carbide-to-water, and the gas is washed and suitably dried. The street lamps are placed every 50 or 60 meters (180 feet), and contain generally one burner only.

(Concluded from Page 92.)

The United States Patent Laws: Historically and Practically Considered.[1]

Under the patent laws now in force in the United States any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law and other due proceedings had, obtain a patent therefor.

It may be remarked here that the word "discovered" in this section of the statute means "invention."

It will be noted that foreigners have the same rights uuder this law as citizens of the United States.

The first requisite to the securing of a patent is the making of an invention. Just what invention is or what it takes to constitute an act of invention is a question that has been discussed by the courts and by text book writers many, many times, and it is a question which cannot be answered by definition. I say this, notwithstanding that definitions of the term "invention" will be found in many text books and in many decisions of the courts. Suffice it to say that invention comprehends a new idea of means and it must be something beyond the scope of merely mechanical effort.

Having made an invention, the next step in the process of securing a patent consists in the preparation of an application and the filing of the same in the Patent Office. This application comprises a petition to the Commissioner of Patents, requesting the grant of the patent for the invention disclosed in the application, an oath answering to the requirements of the statutes, a specification descriptive of the invention, and such specification must be concluded with a claim or claims specifically pointing out the improvement or invention. If no application has been made in a foreign country, the oath should set forth that the applicant is the original and first inventor of the invention disclosed in the application and described and claimed in the specification; that such invention was never known or used before his discovery or invention thereof; that such invention had not been patented or described in any printed publication in the United States of America or any foreign country before his invention or discovery thereof, or more than two years prior to his application; that the said invention had not been n public use or on sale in the United States for more than 2 years prior to his application, and that no application for foreign patent had been filed by him or his legal representatives or assigns in any foreign country prior to his application in the United States. If, however, applications for patents in countries foreign to the United States have been made at the time of the filing of an application in the United States, it is necessary for the applicant to name the foreign country or countries in which such applications have been made, giving the date of the filing of the same.

The claims are necessary to a complete specification. The specification must, of course, be signed by the applicant, who in nearly all cases is the inventor, and the application when forwarded to the Patent Office must be accompanied by the first Government fee of $15. Where the application relates to an invention which can be graphically depicted, it is necessary to prepare and file drawings with and as a part of the application.

If any one of the parts above referred to are omitted, the application will not be accepted by the Patent Office. and the same will not be filed until all of the parts have been received by the Patent Office.

After an application has been received by the Patent Office, it goes to the Application Division, where it is classified, and is then forwarded to the division in the Patent Office in which is to be found the class of machine or art to which the invention belongs. Applications received in the office are examined in regular order, according to their filing dates.

Before the claims of an application are allowed, careful examination of the prior art is made, and only such claims are allowed as distinguish from the constructions disclosed by the patents and other publications discovered by the examiner in his search of the art.

As a rule these examinations are carefully made, though, as you will readily understand, where several hundred examiners and assistants are employed, some of them are more careful in their work than others. The more care taken in the search and examination of the records in the Patent Office, the more likely is it that the patented claims will be valid.

It frequently becomes necessary to amend the claims, perhaps many times, before they can be brought into such shape that they distinguish from the art.

There is one thing that should be understood by all applicants for patents, and that is that the claims of a patent are of the very greatest importance; in fact, I should regard the claims as the most important part of a patent. Unless the claims are well drawn and unless they cover well the invention forming the subject matter of the patent, the patent loses much of its value.

These phraseology of the claims should be accurate. It is as necessary that the elements or parts entering into and forming the combination set forth in a claim should be stated and put together with exactness and precision as it is that the same elements be fitted together with exactness and precision in the machine itself.

As I have already said, the claims of a patent should be drawn with very great care, and should be made as accurate and as exact and as much to the point as it is possible.

I am sorry to say, however, that in many, many instances claims are vaguely and loosely drawn. This in some instances is due to a lack of knowledge of what the invention really is; in others it is a lack of ability to express ideas clearly in writing; in others it is perhaps a lack of effort; and in others it is perhaps due to a lack of proper time; but whatever the cause may be, failure to secure good claims is a misfortune so far as the patentee is concerned.

A writer in the *The Forum*, refering to the diffiiculty of claim writing, has said: "It takes a very experienced hand to avoid defects which will nullify the patentee's proper advantage. An omission is fatal; an addition is fatal; and a vagueness is fatal."

Broadly considered, the claims of an application may be divided into generic and specific claims. If the invention disclosed in an application will support a broad or generic claim, such a claim should by all means be included. But in addition to such claim, specific claims also should be included because it is very much easier to anticipate a broad claim in the prior art than it is to anticipate a specific claim, and it may happen, if the claims of the patent are ever subjected to litigation, that the patentee would be able to sustain the validity of the specific claim but would be unable to sustain the validity of the generic claim. In such cases, the patent, by reason of the presence of the specific claim, would still be of value to the patentee, while, on the contrary, if it had included only the generic or broad claim or claims, which had been anticipated, the value of the patent would be entirely destroyed.

1. Communicated by Mr. C. N. Anderson, at a stated meeting of the Franklin Institute.

It is not always so, but, generally speaking, a broad claim includes a small number of elements in combination, while a specific claim will include a greater number of elements in combination, and these elements may be still further affected and narrowed by qualifying limitations.

It sometimes happens that an inventor, who fully understands the details and principles of his invention, concludes that he is better fitted to write his specifications and claims, that is to say, is better fitted to prepare his application for the Patent Office than someone who has had experience in the writing of specifications and the drawing of claims and therefore undertakes to do this work. It is very unusual to find an inventor who has had sufficient experience to prepare the specification and claims of an application properly, and the chances are about 100 to 1 against his succeeding in drawing claims which adequately protect his invention.

After the application has been placed in condition for allowance, it is allowed by the examiner, after which it goes to the Issue Division of the Patent Office. Then, upon the payment of the final fee of $20, the patent is printed, the grant is prepared and is signed by the Commissioner of Patents, and the patent is issued under the seal of the Patent Office.

Many inventors suppose that when they have secured their patents their troubles are over, but the fact is that if the invention is of any considerable value or worth, the patentee will be beset by a horde of infringers who will attempt to use the invention and secure the benefit of the inventor's thought and ingenuity.

The patentee can protect his rights only by bringing and prosecuting a suit in the Federal Courts and securing an injunction against infringers.

It seems strange that a person who would not think of trespassing upon the real property of another person, or who would not think of interfering with ordinary chattel property belonging to a stranger will not hesitate to trespass upon the patented property of another, whenever it appears to him that such trespassing would inure to his advantage, considered from a business and financial standpoint.

Notwithstanding the fact that patented property is constantly being subjected to the attacks of infringers, such property is very valuable, and, as has already been pointed out, constitutes the basis of investment of many millions of dollars in the United States, and it has been asserted in a comparatively recent annual report of one of the Commissioners of Patents "that we mainly owe to our patent system such foothold as we have gained during the past 50 years in foreign lands for our manufactured products."

The Development of Reinforced Concrete in Europe.

A concrete construction firm exhibiting at the World's Fair advertises: "We do what they did 2,000 years ago." It is true they did it, but how, and in what connection? Twenty years ago concrete work was built, but what a big difference there is between that time and now. No other branch of engineering work has progressed as much as concrete (and especially reinforced concrete) construction in the last few years. It is too early yet to call our age the "cement age," but there is no doubt that the coming age will be the "concrete age."

You gentlemen have more opportunity for big works than European engineers. You have the largest bridges. My countryman, Professor Melan, did not see as many bridges of his design in Europe as you have built in one year. But in one point Europe and America are alike. It is the introduction of a great many systems which are of little advantage. For instance, the man who has done more in Europe than any other man in introducing reinforced concrete in building construction is Mr. Hennebique, whose system is not modern at all. He has created both in Europe and America a system business, but a man who did not want to pay for using Hennebique patents simply changed a stirrup or some other detail and got a new system, usually giving it a new title.

Unfortunately many of these people did not understand the concrete business, and they have retarded the development of concrete construction. But now the public is getting more and more familiar with this construction and does not object to using concrete as a building material. For this reason I think engineers ought to be cautious and do all they can in studying this modern building material. The more tests and the more calculations we make which give satisfactory results in practice, and the more scientifically we try to treat this subject, the more we approach "the concrete age."

Reinforced concrete was used in the United States and England a long time before the magnificent qualities of this material were fully known. I think it is for nearly 50 years. In Europe no reinforced concrete was known or used at that time. In recent years the gardener, Monier of Paris, accidentally found out the good qualities of concrete, and afterward of concrete reinforced by wire netting, which he used to make his garden pots or flower pots less fragile. After having seen his success, he made reservoirs and pipes of reinforced concrete, but no scientific treatment was known to him. The era of reinforced concrete commenced when civil engineers, both theoretically and practically educated, became interested in this line and started to build all kinds of

Girder of Visintini Design Supporting a Floor.

construction and to find out the best way to figure them. At nearly the same time, reinforced concrete was used in buildings by a Belgian architect. He was asked to build a fireproof residence. He chose steel and stone. An experience in a fire in a factory showed him the necessity of enveloping the iron to protect it from the direct influence of the fire, and he used for this purpose cement mortar. In this case the mortar had only to protect the iron, and the iron structure had to carry the whole load. Later he reduced the section of the iron and used both the concrete envelope and the iron to give the required strength.

The fatherland of reinforced concrete is undoubtedly France. I mention the fundamental results which Considere got out by his tests, which showed the superior qualities of the combination of concrete with iron. He found out how superior are the qualities of concrete reinforced with iron above the concrete alone. He discovered what created so much sensation, that reinforced concrete can extend 10 to 20 times as much as concrete of the same composition without any iron, and it was explained that the iron had the quality to make the concrete more extensible, a quality which we cannot explain.

Results obtained from 31 large beams of 6 different kinds of reinforcement show practically the same results as those of Mr. Considere, that the concrete reinforced with iron has a larger extension than concrete alone.

The two principal questions always mentioned by the enemies of the new construction material, are:

1. Does the iron imbedded in concrete rust, and what influence has this rust on the construction?

2. Is there any adhesion between iron and concrete; and if so, how strong is it?

Practical experience has shown that the iron imbedded in concrete does not rust. Baurat Pfeuffer, Vice-President of the Austrian Society of Civil Engineers, and a prominent bridge engineer, had to rebuild a bridge with piers of stone imbedded in mortar. When he pulled down the piers he found, in this old construction, a hammer embedded in the mortar, which one of the laborers had probably lost during its construction. It was very hard to tear off the mortar and the tool was perfectly polished, and without any rust on it. This shows the adhesion between concrete and steel, and also shows that iron does not rust at all in concrete.

Bauschinger made tests in 1892 for the purpose of ascertaining if too much water used in the concrete does not hurt the iron; and he used broken test pieces of reinforced concrete, laying them in water, in the air, and in ditch water for some time, and he found that the reinforcement was not damaged at all by the influence either of water or changes of temperature.

In 1892 Wayss and Freytag, well known contractors in Austria and Germany, built in a small city the whole water pipe system of reinforced concrete. These pipes were some time under water and were of very small dimensions, and the reinforcement was only wires of a very small section. A few months ago the firm asked the city building department to change one pipe at the risk of the firm. The results certified by the city building department, were published in our periodical paper, "Concrete and Steel," and show that the small wires had not rusted in the least, and the adhesion results were satisfactory; and these tests were made of the pipe after 11 years' service. Theory has shown that cement is the best protection against rust, consequently we have to use for reinforced construction a pretty fat mixture of cement mortar.

Mr. Moersch from Berlin, now professor in Zurich, has made tests of the adhesion between concrete and steel, and finds that with certain mixtures the adhesion was as follows:

Cement and Sand.	Water.	Adhesion.
1 to 1	10 per cent.	46 kg. per sq. cent.
1 to 2	15 "	49 " "
1 to 3	.....	40 " "
1 to 4	.....	38 " "

He found after a number of tests of reinforcement by plain bars that to reach the best adhesion between concrete and steel, it is necessary to take a sufficient percentage of water; *i. e.*, to make the mixture plastic. He shows further that the adhesion is small with a poor or lean mixture of cement mortar, and that the adhesion is higher with a fat mixture.

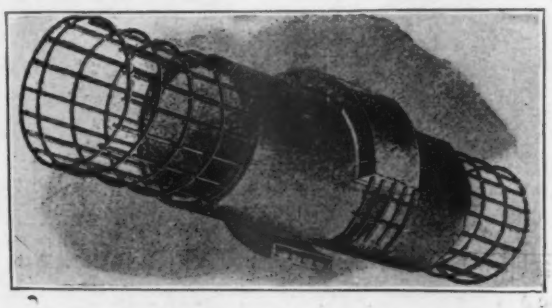
Some engineers, especially here in the United States, claim that the adhesion ceases after a number of years, and that afterwards there is only the mechanical bond between iron and concrete. We have used in Europe until now, as far as I know, only plain bars, and we have built reinforced concrete for a long time, and the results do not show any failure on account of incomplete adhesion between the concrete and steel. Of course, we have to be very cautious in this matter, and to wait for more tests and studies in this line before we can arrive at definite conclusions.

There is no doubt that reinforced concrete is fireproof. You have seen the results of the Baltimore fire and some others, and in my mind there is no building material as fireproof as concrete.

In this short paper, which may give you only a small idea of the development of reinforced concrete construction, it is impossible to speak of all kinds of construction which can be done in reinforced concrete.

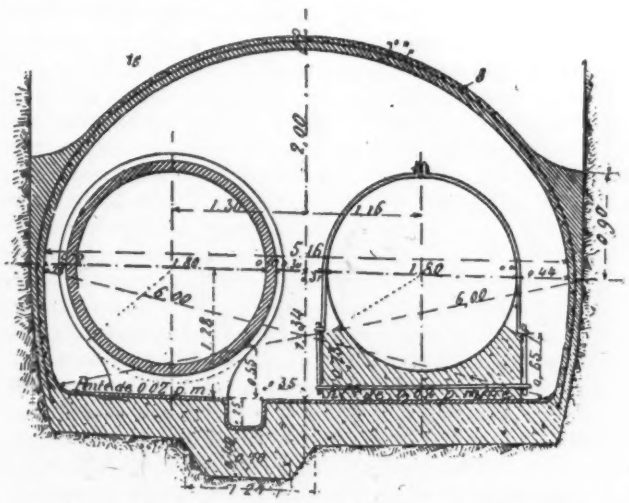
I mention the different bridge systems with and without hinges. Hennebique bridges have not shown very good results, as Mr. Considere states in his paper before the Engineering Congress. The Monier system of reinforcing concrete arches with wire netting has led to the development of a great many arch systems, more or less successful. Prof. Melan's system has been much used by the Concrete Steel Engineering Company, of New York, and was introduced in this country by Dr. von Emperger.

In the matter of water pipes, I would mention the Bordenave system.



Reinforced Concrete Pipe for Conveying Water.

The reinforcement is of "I" beams in both ways, thus providing a good connection between the iron and the concrete. This has been used for the construction of a pipe system in L'once-el-Vebir in Algier. Bordenave made his first exhibit in Paris in 1889. Coignet and Bonna have used their own system for water pipes, and construction made in the Coignet system. In Paris, where they used a great deal of reinforced concrete pipes, they have found that it is about 20 per cent. cheaper than masonry work.

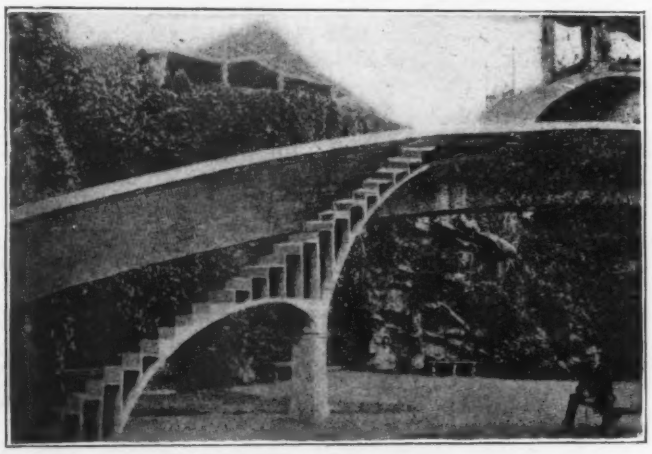


Reinforced Concrete Pipes Placed in Subway of Reinforced Concrete.

But all above mentioned works are only to show what has been done in Europe in this line since 1889.

I would like to go more thoroughly into the use of reinforced concrete as building material, which is most interesting at the present time. In building construction the use of concrete for foundations and footings is generally acknowledged to be the best on account of its high compression strength and its cheapness. In columns made of concrete, reinforcement is necessary not only to provide against lateral bending and shear, but also to prevent cracks. Besides the Hennebique system, a great many other systems are used. In Hamburg there is a 6-story factory building of reinforced concrete, with the front columns covered by sandstone.

Stairways have been built in reinforced concrete for several years, and a stairway was built 10 years ago in the garden of the Portland cement factory in Stettin, Germany, on the Monier system. The stairway is supported by two arches, and was loaded after the erection with a load of 100 pounds per square foot and did not show any crack.



Reinforced Concrete Stairway, Monier Construction.

A very difficult construction in reinforced concrete is a cupola, which was made in 1889 to cover the tomb of Emperor Frederick in Potsdam. The construction is on the Monier system. The ten ribs are reinforced by wire netting and both on the outside and inside is a small sized Monier covering. The roof was covered with copper, and the space 5 feet above the base of the cupola was filled with concrete, to take up the push from the ribs. The lantern which crowned the cupola was also made on the Monier system.

A new building erected in Vienna (Austria) has a corner tower or cupola of reinforced concrete construction. The radius of the cupola is about 9 feet 6 inches. Its height is about 15 feet. It is made on the Monier system reinforced by wire netting.

By far the most interesting and difficult design is that of the floors in a building. I remember the most simple constructions in the beginning of the concrete era, concrete arches between I beams which were used a great deal in Europe in factories and other common buildings.

The Koencu Vountenphatte, so called after the well known pioneer of concrete works in Berlin, has a reinforcement imbedded in the con-

crete, attached to T beams on both sides, this reinforcement being made according to the difference in tensile strength in different sections.

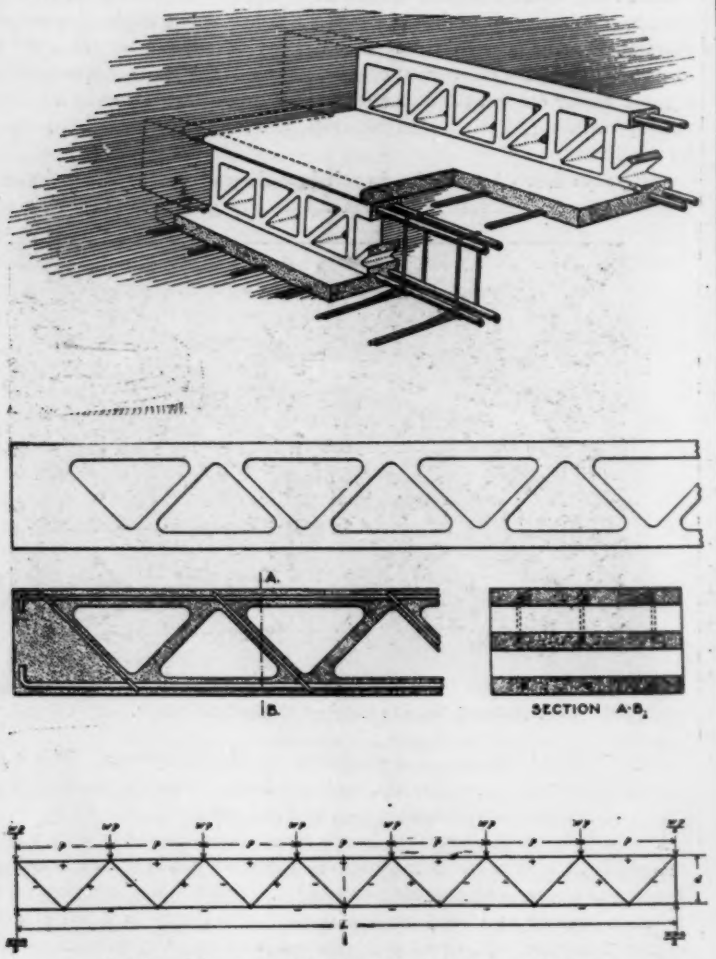
Many other systems have been made, like or unlike, Hennebique, with stirrups or without stirrups, for protection against shear. All of these have the disadvantage that they obstruct the building, and that it is necessary to make them in place with more or less centering and that they are solid, which are very heavy, and that need very much material. Mr. Siegwart, a civil engineer in Switzerland, invented, 3 years ago, a really new system. He designed beams like wooden or iron beams in a factory, making them hollow, thus reducing the weight besides other advantages. Visintini, an Austrian, who has worked in concrete and reinforced concrete in Switzerland, invented a new system 2 years ago, a real latticed system of beams in reinforced concrete.

The Visintini system of girders can be used for floor construction as well as for bridge construction. The principle of the construction is that every beam can be made either 8 inches wide or 1 foot wide.

In the first case 2 iron frameworks for reinforcement are imbedded in the concrete in 2 longitudinal sections 5 inches apart, 1 rod in the upper flange and 1 rod lower flange, both rods connected with iron ties.

In the second case—1 foot beam—there are 3 reinforce frameworks imbedded in about the same distance as in the 8-inch wide beam, the rods in the tension member being simply bent around to the upper and lower flange. They are put in place side by side under recesses; the space between the 2 beams is filled out with mortar in a mixture of 1 to 3.

From a theoretical point of view it has the same advantage over the solid beams as latticed steel girders have over the plain plate girders. The stresses are distributed in the center of every member as we assume



Reinforced Concrete, Visintini System for Stairways and Beams

hinges at every panel point as in lattice steel girders. The concrete is only to take up compression and it is not figured for tension, the tension being carried by the steel bars, which are imbedded both in the upper and lower flange and in the ties; the diagonal struts are made in concrete only, as there is no tension in them, and the concrete alone can take up the compression stresses. It would not be necessary to reinforce the upper flange, because it has no tension in it except to furnish attachment for the diagonal ties.

The design of these beams is very simple; the stresses of every member can be figured both in an analytical and graphical way in the same manner as for lattice steel girders. After having figured the stresses, it is easy to find out the section of every member; the tedious method necessary te figure the neutral axis is not necessary in calculating the Visintini lattice girders, as the resultant stress works to the center of every section. The girders can be made to a span of about 30 feet.

Mr. Visintini designed a bridge in Breslau (Germany) with a clear span of 35 feet. The beams were 8 inches wide, with the upper flange 6 inches thick at the center and 4 inches thick at the support, and with 4 bars of ⅝-inch diameter.

The lower flange was uniform, 3.5 inch thick, with 4 bars of 1-inch diameter, and the diagonals were 1½ inches thick, with 4 bars ½-inch diameter. The height of the beam is about 28 inches at the center; the live load was 160 pounds per square foot, and the dead weight about 80 pounds per running foot.

Both Siegwart and Visintini beams are fireproof. The Siegwart beams, which were tested in New York city last August, withstood a fire of 1,800° F. all right. The Visintini beams stood fire tests at the London Exposition fire in 1903, and a new test, which was made about 2 months ago in Trieste, showed the best results for the protection of the iron against the fire, although the concrete protecting the steel bars is only ⅝-inch thick.

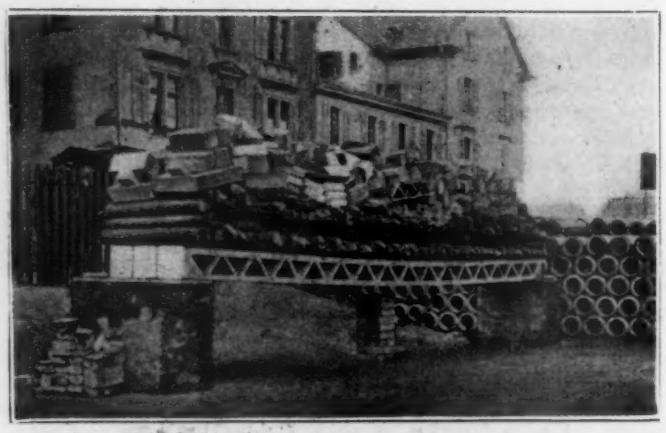
The test was carried out on two girders, each 10 inches high, 8 inches wide and a length of about 17 feet; between the two beams was supported 1 Monier slab, 1½ inches thick and about 4 feet wide. These two supports, attached to the beams, were 1½ inches high and 1½ inches wide. The clear span of the girders was about 16 feet. The floor had a dead load of 32 pounds per square foot, and was loaded with 2,000 pounds. The fire which was made to test this floor lasted half an hour, and was of a temperature of about 2,000° F. It was extinguished by water, then the floor was allowed to cool off and was loaded with 2,620 pounds, which is nearly 5 times the safe load. The girder showed not the slightest cracks—only a deflection of about ¼ inch, and broke down under a load of 2,800 pounds. The beams had an age of only a few days.

The advantages of this system are as follows:

1. The beams can be made in a factory under good supervision and prepared during the excavation and other building work.
2. They have a minimum of material and more strength than a solid beam of the same height.
3. Their dead load is less than by other systems.
4. The flues can be used for pipes and conduits.
5. The flues are filled with air and temper the building and make it impervious to sound; the vibration is less than with solid construction, as these are distributed at every panel point.

In closing I would like to mention the pioneers in the concrete steel science in Europe; most of them you know very well.

In France, Mr. Considere, whose testing works are known all over the world; Mr. Christophe, whose book, "Practical Treatise on Reinforced Concrete," was the first collection of executed works in reinforced concrete; Mr. Coignet, and the father of reinforced concrete business,



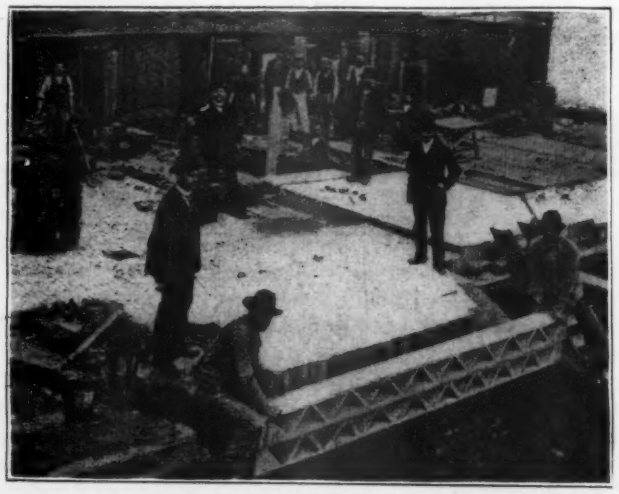
Reinforced Concrete Beam, Visintini System, Under Test.

Mr. Hennebique; and last, but not least, Mr. de Tevesco, whose book, printed a few months ago and containing designs of reinforced concrete of different systems, will be more appreciated a few years later, as it is the work of a man who has worked in plain and reinforced concrete since the beginning. In Germany: The theorists are Bach and Bauschinger, Koenen and Prof. Moeller, from Baunschweig. In Austria: Dr. V. Emperger, the editor of our periodical paper, "Beton und Eisen," a man who is known in the United States as well as in Europe.

Gentlemen, what I have told you about the development of reinforced concrete in Europe and of the new types of construction is only a very little view of what is done and what is being done in Europe, and I only wish we Europeans could have more understanding with you than only by the papers. Engineering works are international, and a scientific understanding by the civilized nations helps very much; and so I hope we will have more exchange of ideas in the future in the particular line of reinforced concrete construction.

Discussion.

Mr. W. L. Abbott—It is difficult now to comprehend how reluctant people were, only a few years ago, to use concrete. I can remember that 15 years ago scarcely any reputable engine builder would risk his engine on a concrete foundation. They would say, "Concrete *may be*



Reinforced Concrete Beams, Visintini System, being Set in Place for Floor Construction.

all right, but we know that a foundation built of brick or stone is all right." With the development of concrete work, and especially reinforced concrete work, within the past 10 years, we may look for more startling improvements in the future.

Mr. McCullough—I think there was a little misstatement in a remark that Mr. Probst made about the reinforcing of the experimental beam; that is, I believe he stated that the reinforcement in the upper cord of the beam was 3 inches. This should have been 3 rods, each of 1 inch, should it not?

Mr. Probst—Yes, you are correct.

Mr. Schaub—I have been very much interested in this paper, in as much as it confirms, in a measure, some of the practice in this country; but I must confess that I was a little disappointed that there were not some structures shown which are used for carrying vibrating loads, such as railway bridges. The use of concrete for static loads is entirely different from its use for vibrating loads, and I would like to ask whether such structures are used for railway purposes?

Mr. Probst—Not very much. As far as I remember, arch bridges for railways have been made 50 to 100-foot span; I know of some works of Wayss and Freitag in Bavaria, also two in Austria; but I do not remember very much other work in railway bridges.

Mr. Schaub—I do not think any of the American railway engineers would risk a structure built on the lines illustrated to-night. I think, too, that the forms of construction are running a little wild, both in this country and in Europe. I feel sure that an American engineer would not approve of the lattice form of girder, such as was shown on the screen, for railway purposes in this country.

Mr. Probst—As far as I know Mr. Visintini did not expect this system would be used for large railway bridges.

Mr. Schaub—If the principle is right in one case, it seems to me it ought to be right in all cases.

Mr. Probst—The principle is all right for buildings and highway bridge purposes, but it has not been figured out for moving loads, such as in large railway bridges.

Mr. Finley—But why have they not gone more into railway bridge work in Europe?

Mr. Probst—First, because they do not do very much work in railway bridges in Europe in the line of reinforced concrete. The same is true there as here in the United States—that reinforced concrete is not very much liked by engineers who are not interested in reinforced concrete works or by the railway people.

Mr. Findley—Have you had any trouble from the failure of reinforced concrete used for buildings that would lead others to doubt the advisability of its use for railroad bridges?

Mr. Probst—We had the first failure in Switzerland some years ago in the way of building construction; the construction, I believe, being very much like the Hennebique system, From that time the development of reinforced concrete was interrupted for a long time in Switzerland, but concrete and reinforced concrete is once more being used very extensively. Especially in Vienna and Berlin they are using it for floors and columns.

Mr. Finley—Have they had many concrete failures?

Mr. Probst—Not many; the failure I referred to at Munich was not due to the concrete work, but was the fault of bad supervision.

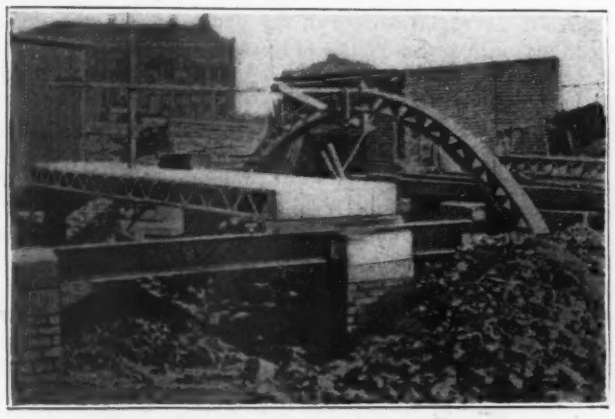
Mr. Finley—What I am trying to get at is the nature of the failures; whether they were due to the form of construction, materials or poor workmanship?

Mr. Probst—I am inclined to think that both the bad centering and poor labor caused these failures.

Mr. Finley—What would you think would be the result in the case of a building constructed according to the last form shown in the illustration in the case of a slight earthquake. What would be the effect on that type of construction?

Mr. Probst—The effect would be the same as in any kind of construction. Did you think the effect would be different in this particular kind of construction?

Mr. Finley—I question whether a building constructed according to that form, if subjected to an earthquake, would prove as efficient as



Reinforced Concrete Beams, Visintini System, may be Arched as well as Flat.

steel construction, for the reason that the concrete would be subject to stresses.

Mr. Probst—I believe in reinforced concrete, and I think an earthquake would have no more effect on a reinforced concrete construction than with iron or steel construction.

Mr. Finley—From the fact that you are not developing reinforced concrete in Europe—the home of it—this indicates that you have not confidence in it yourself.

Mr. Probst—If I could build a bridge now in Europe, I would do it right away. Mr. Lindenthal, who is a steel man, told me a few weeks ago at the Engineering Congress that he is now giving a good deal of study to reinforced concrete bridges for railway purposes.

Mr. Finley—Yes, a great many are dreaming about this.

Mr. Seafert—Is there not a design of a bridge in the railway exhibit in the Austrian Building at St. Louis?

Mr. Probst—In the Austrian Building there is a model of the falsework for a 240-foot span bridge now being built entirely of concrete; a single arch, and not reinforced.

Mr. Schaub—Perhaps I may have given Mr. Probst the wrong impression. There are some railroad bridges being built, but not according to the design shown on the screen.

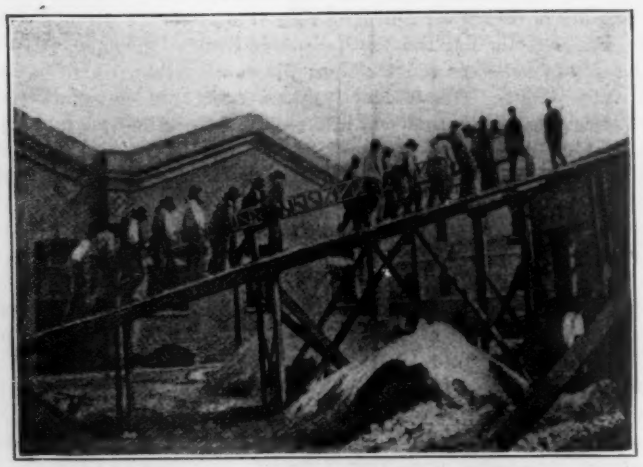
Mr. Spelman—Would the bars, in the compression flange, take care of the earthquakes?

Mr. Probst—I will simply say that we will have to wait for the next earthquake.

Mr. Abbot—The object, as I understand it, in putting those iron bars in the upper flange is for mechanical strength in handling it.

Mr. Probst—It is only for better connection between the lower and upper flange. Otherwise it would not be necessary to put any iron in the upper flange.

Mr. McCullough—As I understand it, you place in the tension members of that truss, tension rods to take up the stress.



Reinforced Concrete Beam, Visintini System, Made Away from the Building but to be Carried There and Set in Place.

Mr. Probst—The tensile stress is only taken up by the rods and the concrete does not take up any tension stresses.

Mr. McCullough—In the tension members of the trusses or beams you put wire, or rods, and it is connected, by the stirrup, to the longitudinal bar in the beam and the top members. The idea that these gentlemen were trying to convey was that putting longitudinal reinforcements in the upper member of the girder causes an actual loss of strength. Could not that matter of connecting the rods be arranged by putting in the top member pieces going across, instead of lengthwise of the girder?

Mr. Probst—I do not think it is necessary. As far as I know the longitudinal rods all make the upper flange stronger, because the iron, in connection with the concrete, has to take up the compression in the upper members.

Mr. McCullough—But in the experiments that have been made, any reinforcement made in the compressive side of the bar tends to lessen the strength of the bar. What factor of safety do you use?

Mr. Probst—The factor of safety is 10 for concrete and 5 for steel.

Mr. McCullough—It might be interesting to make one without any longitudinal rods in the top member, one with longitudinal rods, and then make another with the pieces across, and test all of them similarly.

Mr. Probst—The results of tests which have been made with the longitudinal rods have been very satisfactory.

Mr. McCullough—The idea these gentlemen are trying to bring out is that in the case of stresses in the steel concrete construction, the presence of that longitudinal reinforcement in the top member of the Visintini beam might prove a source of weakness.

Mr. Probst—But I do not think that is the case.

Mr. Condron—In regard to the factor of safety, Mr. Probst says that in their designing they use a factor of safety of 10 for concrete and 5 for steel; what is the element of stress in the steel taken at? Or, what is your working stress in the steel?

Mr. Probst—Fifteen thousand pounds per square inch.

Mr. Abbott—Am I to understand from that a reinforced beam would be stronger without concrete in the lower member, or with the steel not incased in cement?

Mr. Condron—No, that is not the correct understanding.

Mr. Abbott—I understood from your statement that the beam fails when the steel reaches its elastic limit.

Mr. Condron—Yes, it does.

Mr. Abbott—If it were not incased in cement it would not fail until it reached its limit of strength.

Mr. Spelman—Am I correct in understanding that the statement was made that beams with reinforcing rods on the upper side are not as strong as one without them.

Mr. Abbott—That was the statement made.

Mr. Spelman—That putting steel in the compression side of the beam would weaken it?

Mr. McCullough—The experiments that were made showed that a solid beam, reinforced both in the top and in the bottom, did not develop the same strength as in a beam reinforced in the bottom alone.

Mr. McCullough (by letter)—It seems hardly a proper thing to look too soon for a general application of this system to the construction of highway and railway bridges. The idea of the inventor seems to have been to secure economy of material and lessening of dead load in building construction. Advocates of concrete fire resisting construction as opposed to tile fireproofing have here a system which removes at once the principal objections to concrete—excessive weight. It also settles another great objection, namely, slow construction because of the necessity for the use of forms, which cannot be removed until the concrete has sufficiently set.

The Visintini beams and columns can be built in factories and brought to the building site precisely as metal is now brought. They are set in place without forms or special devices of any kind, and at least as readily as wood. The form of truss is simple, and the calculations simple. The concrete is not expected to carry any tensile strain, and the tensile members are of steel protected by an envelope of concrete. The compression members are entirely of concrete. The presence of metal in the upper chord makes no exception, as it is simply placed there to tie the diagonals to the lower chord. A transverse piece at the panel points would serve as well, but would not be so convenient. The system has nothing to do with the question of the employment of plain, corrugated, or bulbous rods, but is simply a new method for reinforced concrete construction, designed to save material and weight.

It is common nowadays to hear engineers say that steel concrete is only better than solid concrete construction when the reinforcement effects a saving of 50 per cent. of concrete. If this is only partly true, such a system as here described will repay investigation.

Testing Cylinder Oils.

[By M. EMILE LECOCQ, in *Le Journal de Petrole.*]

The best method of determining the value of a lubricating oil is the practical test of this oil on the machine for which lubrication is needed. If the inquiry is raised, which are the best lubricants for different machines or the different organs of the same machine, it is necessary, by a series of tests methodically conducted, to take account mechanically of the manner in which these lubricants behave with reference to the diminution of friction and to the consumption of oil or fat.

These points being established, it is necessary to seek, by means of chemical analysis, the series of characteristics for fixing the composition of the lubricants which have been practically tested for determined conditions, for it is important that the seller should know what products he may offer, and that the buyer should be sure of those which he is to accept, without possible doubt in price currents or a bill of sale. There will be much less security if the buyer is obliged to apply tests to machinery for the purpose of deciding on the acceptance or refusal of lubricants, than if a well trained chemist should determine the composition according to approved analytical processes.

The chemical analysis of lubricants would consist in the determination of the degree of purity of the fats, properly so called, if industry had not for a long time utilized for the lubrication of machinery the complex mixtures of hydrocarbides constituting the residue of the distillation of petroleum. The great majority of lubricants consist to-day of mineral oils; in many cases the results of their employment are superior to those of their predecessors, the ordinary fats, while the price of the latter is kept at double or triple the rate of the former; it will, therefore, be mineral oils that are to be considered, if one wants to buy lubricants both suitable and inexpensive.

Suppose that detailed tests on machines after eliminating a numerous series of valueless products, have determined the choice of certain good types of lubricants, what then will be the role of the chemist charged with verifying their composition? In the same way as, under ordinary circumstances, the analysis of fats, properly so-called, does not reveal the immediate composition of their components, so the analysis of mineral lubricating oils does not seek to separate them, and to determine the numerous hydrocarbides forming their composition. Not that, in the present state of our knowledge, the system could not be realized for the oils in question, but an analysis would end in classifying and determining in a single sample some twenty hydrocarbides, making use of the standard processes of halogenation, alcoholization and perhaps those of oxidation. Such an analysis would involve an expense of time which would render a rapid and efficacious verification impossible.

The determination of a certain number of constants will often enable the chemist to identify the ordinary fats; these have, over mineral oils, the advantage of nearly a fixed composition. The list of certain physical and mechanical properties, capable of being made in a precise way and a short time, may, up to a certain point, enlighten us on the identity of mineral oils. The estimation of density, of viscosity, of resistance to movement, of the coefficient of lubrication, may be included among the properties to which I have referred. I would be able to add the

nvestigation of the flashing point, if the studies of Kunckler and my own had not demonstrated its complete uselessness as an element of appreciation of lubricating oils from different points of view; but it must not be forgotten that mineral oils are essentially variable in their composition, and it may be that an oil, having the same density, the same viscosity and the same coefficient of resistance to friction as another may, however, have a different composition, and manifest the difference in its results on machinery.

It seems to me that without calling for a classification and a determination of all the hydrocarbides of these oils, in order to identify them surely, we might succeed in fortifying the opinion of the chemist who is charged with analyzing them, by putting at his disposal a greater number of guiding points than those of which he now makes use.

Without claiming absolute certainty in the investigation of the identity of a mineral oil, fractional distillation constitutes a valuable method for the industrial chemist. It has been especially applied to gasoline and to lamp petroleums, both in their industrial preparation and in the analysis of their products. The distillation of these substances being effected between 30° and 300° C. at ordinary pressure may be conducted with naked fire by well established arrangements if results are desired which can be compared with each other.

Numerous analyses made in this way have contributed to secure a classification of lamp petroleum and of the benzins of petroleums, which is now generally accepted in industry and commerce.

I have applied to the analysis of lubricating mineral oils the fractional distillation, which has hitherto been limited to employment in the analysis of the lighter products. Still, proceeding from the last portions of lamp petroleums, distilling at about 300° C. the distillation cannot be continued with naked fire at the same pressure without decomposing the contents of the retort; it has been necessary to make use of a process which allows of completely distilling any mineral oil.

The method of analysis which I have the honor to propose for the examination of lubricating oils has been long employed in certain researches of organic chemistry. Rasinski has applied it to the study of petroleum hydrocarbides from a scientific viewpoint, without being, as it appears, quite satisfied with the results obtained. The distillation in superheated steam may be utilized in the analysis of any mineral oil, and even of a mixture of mineral oil and resin or coal tar oils, but certain circumstances have led me to confine myself at present to data relative to cylinder oils, for which I have been able to bring together a larger number of analyses than for other kinds of lubricating oils. The apparatus used in the analysis consists of a reservoir of enameled sheet iron, 3½ liters in capacity, with a copper cover, tightly fitted; a copper tube, 10 millimeters in inside diameter, turned in spiral form 6 times on a diameter of 35 millimeters; a Jena glass receiver of 1 liter, with rounded bottom furnished with cork stopper and a thermometer ranging from zero to 260° C., and a Liebig condenser 80 centimeters in length.

After filling two thirds of the reservoir with water, a subjacent gas burner is lighted, so as to give a strong heat; 25-30 grams of oil are introduced into the glass recceiver; then the thermometer is so adjusted that the mercury bulb is 3 or 4 centimeters below the lower part of the stopper, which penetrates about 2 centimeters into the neck of the receiver. The copper tube coming from the steam reservoir passes through the stopper and ends in the oil at the bottom of the receiver. A glass tube of 8 or 9 millimeters in diameter commences at the level of the thermometric receiver, passes through the stopper, bends at an acute angle 12 or 13 centimeters above and penetrates the condenser.

The distillation in steam requires as much, or even more than is the case with fractional distillation, strict observation of the conditions of the test, which is fixed once for all, in order to be able to obtain comparative results.

This is the modus operandi adopted for the examination of these oils. Before the appearance of the steam in the receiver a single burner under it and a triple burner for heating the copper tube have been lighted, but allowing for each of them only a very small flame; the burner heating the receiver will need only a flame of about 4 c. m., of which the point ought not to reach the wire cloth supporting it. On the entrance of the steam in the receiver, the intensity of the flame of the burner heating the copper tube is increased a little; at this moment the mercury of the thermometer should indicate 100° C., the production of the steam is so regulated that the receiver, becoming hot rapidly, can condense only very small quantities. It should be observed whether, with rise of temperature, particles of oil appear in the water escaping from the condenser. As soon as this phenomenon becomes distinct, the first portions of the distillate are collected in a graduated tube of 75 cubic centimeters, divided into tenths and fifths.

To prevent oil bubbles from adhering either to the central tube of the condenser or to the graduated ubes, the water of the condenser is allowed to heat, while suspending the flow, which ought not to be resumed in the course of the distillation, except intermittently and briefly, jnst as is necessary for preventing the vaporization of the oil at the exit of the condenser.

According to the cylinder oil which is to be analyzed, the distillation proceeds at a temperature of 140° C. to about 200° C. At the moment when this distillation commences, the production of the steam is lowered a little; on the contrary, the flame of the burners heating the copper tube and the receiver is raised.

When a third of the total quantity of oil has been distilled, the gas burner of the superheating apparatus is opened to its full extent; the burner of the receiver should be opened but very little at a time. The distillates are collected from 10° to 20° C. in similar graduated tubes placed on a support.

As the operation proceeds, the admission of the gas to the burner under the receiver is increased more and more, until, at the end of the distillation, the flame envelops its lower part. To prevent decomposition from occurring in the oil still remaining in the retort, the steam is allowed entrance *ad libitum*, and the intensity of the flame under the receiver lessened a little.

A glance at the inside of the receiver allows of readily seeing whether all of the distillable components have disappeared; the operation is then stopped.

The list of the distillates obtained from 10° to 20° C., estimated in tenths or fifths of a cubic centimeter, is made out, and the number of these divisions, compared with the total list of the divisions, multiplied by 100, expresses the volumetric percentage for each of the distillates.

I hope to be able to apply this method of analysis to more complex mixtures of oils, and to the exact determination of the dark residues of certain mineral oils. The distillation in steam, joined to the table of the density, the viscosity and resistance to friction, allows of readily classifying a lubricating oil for its precise purpose.

Anent Tariff Revision.

"W. L. C.," writing in *Iron Age*, says that the conference at the White House, the evening of the 7th inst., between the President and 9 prominent Republican Senators and Representatives, at which the necessity for tariff revision was canvassed in detail, has served materially to strengthen the impression reflected in this correspondence last week that the Dingley act will be very comprehensively overhauled in the coming Congress, that the work is likely to be done during the recess and probably at a special session to be held in October, the idea of a spring session having been abandoned. No incident of the current session has attracted as much attention as this conference, the developments of which were of much significance, showing that several prominent Senators, who heretofore had been regarded as the strongest "stand-patters," are leaning toward tariff revision, apparently as the result of pressure brought to bear by their respective constituencies.

Widely differing reports of this important conference have been circulated in the daily press, but the correspondent of the *Iron Age* is able to give a brief but accurate outline of the exchange of views between the President and his callers. Those present were Senators Aldrich, of Rhode Island, Chairman of the Finance Committee; Allison of Iowa, Platt of Connecticut, and Spooner of Wisconsin, all members of the Finance Committee; Speaker Cannon and Representative Payne, of New York, Chairman of the Ways and Means Committee; Dalzell of Pennsylvania, Grosvenor of Ohio, and Tawney of Minnesota, all prominent members of the Ways and Means Committee. Of these distinguished men, all of whom have had a wide experience in the drafting of tariff bills and in the discussion of customs problems of all kinds, Messrs. Allison, Aldrich, Spooner and Tawney very frankly stated that the time for the revision of the tariff was not distant. Senator Platt, Speaker Cannon and Representative Dalzell were outspoken in opposition to what they styled "tariff tinkering," either now or in the 59th Congress, the Speaker declaring that throughout the recent campaign he spoke both in the East and West and never encountered tariff revision sentiment. Chairman Payne, of the Ways and Means Committee, and Representative Grosvenor had very little to say, but indicated tha they were quite prepared to follow the President's lead if he should decide that revision was necessary, either at an extra session to be held during the coming recess or at the regular session of the 59th Congress, beginning in December next.

Great interest attached to the statement made by Senator Allison, who happened to be the first called upon by the President to express his views. Senator Allison has a reputation for being one of the most conservative men in Congress, and owing to his ability to bring peace out of strife has come to be known as the great harmonizer. His particular brand of harmony usually takes the form of a compromise, and all his colleagues at Saturday's conference awaited with close attention the expression of his views, especially as in the controversies that have been waged in Iowa between Governor Cummins on the one hand and Secretary Shaw on the other, regarding the advisability of revising the Dingley act, the senior Senator has maintained a neutral position. On this occasion, however, Senator Allison said that he believed there was a demand for tariff revision in the West, and that certain modifications of schedules were desired in other sections. So far as he was concerned, he was quite willing to leave the matter to the judgment of the President.

On one important point, however, Senator Allison spoke with great freedom. He said that he had noticed in the press statements to the effect that members of the House were disturbed lest, as the result of the revision of the tariff, there should be a revulsion of feeling against the Republican party throughout the country whereby many Republican members of Congress would lose their seats. This, he said, was "pure nonsense." The Republican party would control both Houses in the Sixtieth Congress, in his opinion, whether the tariff was revised or not and without regard to whether the schedules were comprehensively overhauled or merely "readjusted." Congress ought to do its duty without regard to political or personal considerations, but it ought to ascertain by very careful investigation just exactly where its duty lay in order that no blunders should be made.

Representative Tawney was one of the most outspoken of those present in insisting that there were many inequalities in the tariff that ought to be remedied at the earliest possible moment. He was reelected on a platform pledging tariff revision. While he was not prepared to advocate a policy of free raw materials, he thought that in a number of schedules the rates should be reduced if not entirely repealed.

Senator Platt of Connecticut stood out stoutly against the necessity of any changes in the tariff. He said that in his opinion present conditions not only called for no change, but were such as to indicate that modifications of any importance would be distinctly injurious and might speedily put an end to the prosperity which now prevails in all sections. Senator Platt's motto was, "Let well enough alone," and he emphasized it in characteristic fashion.

The President devoted himself chiefly to asking questions, but the trend of every inquiry showed his strong desire for tariff revision at an early date and at an extra session to be held some time during the coming recess. He seemed especially pleased that Senators Aldrich, Allison and Spooner should concede that certain features of the tariff needed readjustment.

Upon the conclusion of the conference a statement was given out by the President's private secretary to the effect that the tariff had been very fully canvassed in connection with one or two other matters, and that, while no conclusions had been reached, the conference was only a forerunner of others at which it was expected that some general policy would be determined upon.

As a result of this preliminary discussion, however, the general impression of those who attended the conference and have since reflected seriously upon the subject is that an extra session will be called next October for the revision of the tariff. The spring session plan has been abandoned for reasons heretofore set forth in this correspondence. A subsidiary plan is now being discussed with considerable favor involving authorization for the meeting during the recess, either in joint or seperate sessions, of the Finance and Ways and Means committees for the purpose of drafting a tariff bill to be presented either at the special gession or the regular session in December.

It has been customary in the past for each committee to draft its own bill, and when the House measure has reached the Senate it has been stricken out and the Senate bill substituted; with the result that two or three weeks are usually occupied by the Conference Committee in harmonizing the difference between the two houses. Joint sessions of the two committees would result in the drafting of a single bill that would be fairly satisfactory to both houses and much time can be saved. Such a measure could be passed by the House after a debate lasting not more than a week, and practically all the time consumed in revising the tariff would be spent in the Senate discussion. Those who oppose a special session next fall point to this method as likely to economize time to such an extent as not to seriously interfere with the current business of the regular session. In any event, if it should be adopted it would reduce the length of the debate very materially, and as applied to a special session beginning in October would probably enable Congress to adjourn a week or two in advance of the December meeting.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. John Cabot, the fame of whose tray specialties for gas works, is world-wide, writes that 1904 was an unusually good one for his wares, orders for the same, outside of those in the States which were more numerous than in recent years, having been received from Canada, the West Indies and South America. The Cabot trays were awarded a gold medal at the St. Louis Exposition.

"Observer," writing from Boston, Mass., under date of the 16th inst., incloses the following, which has to do with some public affairs in Middleboro, Mass.: "The manner in which the municipal lighting plant of this place, and the well-locked financial box that it holds, were recently set forth by the members of the Business Men's Club, and through the agency of the local press. A total expenditure of about $150,000 has proven more conclusively than anything that municipal owernership with control of public commodities is a failure, as practised here. It is anticipated that the Club's discussion of the question will result in the placing of an article in the town meeting warrant that will bring the whole matter before the voters. Those who are not infatuated with the socialistic doctrine of municipal control would like to see the entire gas and electric plant sold for what it will bring in an open market, with a contract from the town to purchase street lighting for a term of years, if necessary, from the private owners, in order to get the white elephant off the town's hands. The taxpayers look back with longing to the years when the town bought its street lighting of private concerns at a contract price of $3,500 per year, and received better lighting and more of it than it has of late from the municipal plant."

Those connected with the manufacture of fireclay materials for gas works in this section of the States, will be pleased to know that Mr. Carl Augustus Raines Dickel, of Philadelphia, is no longer a bachelor. The former name of his equal partner in the matrimonial venture was Frances Florence Pickett, and the binding words were spoken in Philadelphia, Tuesday the 10th inst. Mr. and Mrs. Dickel will be glad to welcome their friends, after March 1st, in 326 North Robinson street, West Philadelphia. Good luck to the pair.

Mr. Theodore N. Case has resigned from the engineering staff of the Consolidated Gas Company, of this city, to accept a responsible position with the Kerr Murray Manufacturing Company, of Fort Wayne. His acceptance becomes effective the 1st prox.

Mr. William H. Cooper, Superintendent of the Chuctanunda Gas Light Company, of Amsterdam, N. Y., writing to the Journal under date of the 16th inst., says: "In your issue of to-day we notice a paragraph referring to this Company, in your Items of Interest from Various Localities, in which you state that this Company has put the gross selling rate at $1 per 1,000 cubic feet, a rebate of 25 cents per 1,000 to rule for prompt payment (within 15 days) which would mean 75-cent gas. The selling price, gross and net, was $1.25; the new rate will be $1.25, gross, subject to 25 cents per 1,000 discount, if settlements are made at the office of the Company on or before the 15th of the month following date of bill."

As a sample of the posers that are sometimes put to us, the following is submitted: "To the Editors American Gas Light Journal: I have been appointed administrator [the name of the decedent, who was a subscriber to the Journal, is given] of his estate. He held some Providence gas stocks. What ought they be worth a year from now?" Our reply naturally is that we cannot say specifically; but we will venture the prediction that they will be worth in 1906 quite as much as they are now.

Dr. Otto Schniewind, Vice-President of the United Coke and Gas Company, of New York city, writing under date of the 16th inst., says: "We beg to announce that the lease of our by-product coke oven business to the Semet-Solvay Company, of Syracuse, N. Y., has terminated. This puts the United Coke and Gas Company in the former position of exploiting by-product coke ovens of the Otto-Hoffman and United Otto types. The great numbers of these ovens now in operation or contracted for (2,608 ovens in the United States and Canada) demonstrate conclusively that the by-product recovery in the manufacture of coke is

now permanently established. The American Coal Products Company, 17 Battery Place, New York, will continue to act as selling agent for the tar and ammonia produced by both the United Otto and Semet-Solvay ovens." The officers of the United Coke and Gas Company are as follows: Directors, G. W. Elkins, W. H. H. Childs, I. D. Fletcher, Stephen Peabody, Albert Strauss, Eversley Childs, S. E. Barrett, E. McMillin, R. C. Pruyn, G. D. Widener, Ed. C. Converse, Powell Stockhouse, F. Schniewind and T. M. Blanhard; Chairman, G. W. Elkins; President, W. H. H. Childs; Vice-President, F. Schniewind; Vice-President and Treasurer, T. M. Blanhard; Secretary, E. J. Steer.

MR. CHARLES R. KELSEY, Secretary and Treasurer of the Alabama Gas Company, reports that the Company's plant at Florence, Ala., shows an increase in output for the first 4 months under the new ownership of 40 per cent. The comparison is made with the corresponding 4 months of the preceding year.

MR. POND, the energetic Superintendent of the Petersburg (Va.) Gas Company, reports that business there is booming, which satisfactory condition is largely traceable to the sensible system of main extensions recently completed.

UNDER its new articles of agreement the name of the Hamilton (O.) Gas Light and Coke Company has been changed to that of the Hamilton Gas and Electric Company. The common stock has been moved up to a par value of $1,000,000; which would seem sufficient for the normal purposes for which it was issued.

Mr. WILLIAM J. BUELL, for several years a trusted employee of the Denver (Col.) Gas and Electric Company, died in that city, from an apoplectic shock, some days ago. Deceased, originally an inhabitant of New Haven, Conn., resided in Denver since 1885. His widow and 3 children survive him.

THE officers elected at the annual meeting of the Peoples Gas Light and Coke Company, of Cleveland, (O.) were: Directors, George H. Warmington, D. R. Warmington, M. A. Bradley, C. Beardsley, and J. M. Carrington; President and General Manager, George H. Warmington; Secretary and Treasurer, W. R. Scadden.

At a stockholders' meeting of the Springfield (Mass.) Gas Light Company, held last Thursday, it was agreed that the capital stock should be sensibly increased. It was also determined that the time for making the annual reports should be changed from January to October of each year.

MR. GEORGE D. ROPER, who has been in one way or another prominently connected with the gas stove industry of "America" for several years, is now, through the ballot of his fellows, a member of the Board of Directors of the Illinois Manufacturers' Association.

SOME of the "astute" local authorities in control of the public matters of Malden and Melrose, Mass., are considering the advisability of engaging the taxpayers of the named districts in the operation of a public gas and electric lighting plant. Respectfully referred to the taxpayers of Middleboro, Mass., and to the Board of Gas and Electric Light Commissioners.

THE proprietors of the Marinette and Menominee (Wis.) Light and Traction Company have decided to rebuild the gas plant at Marinette. The decision to the ordinary onlooker seems a wise one.

MR. RAINE has presented a bill in the Tennessee Senate which proposes to amend the charter of the city of Memphis, permitting it to acquire or construct and operate on municipal account gas and electric lighting plants. The bill also authorizes the putting out of $1,000,000 4 per cent. bonds to run for 30 years. This would seem that the Hebrews are willing to "give the public a chance."

MR. H. M. LITTELL, recently appointed Vice-President and General Manager of the San Antonio Traction Company and the San Antonio Gas and Electric Company, of San Antonio, Tex., is now administering the affairs of the named concerns.

WE understand that the owners of the Hudson River Electric Company, of Glens Falls, N. Y., have acquired possession of the plants and properties of the United Gas and Electric Light Company, of Sandy Hill, N. Y., which concern has been doing a thriving business in the villages of South Glens Falls, Sandy Hill and Fort Edward.

AT the annual meeting of the Dayton (O.) Gas Light and Coke Company, the following Directors were elected: R. R. Dickey, Sr., H. C. Graves, J. K. McIntire, Chas. H. Oglesby, Simon Gebhart, J. A. McMahon, W. K. Callahan, D. R. Corwin and R. R. Dickey, Jr.

AT the annual meeting of the Williamsport (Pa.) Gas Company the Directors elected were: James B. Bailey, H. E. Gawtry, F. S. Male, Seth T. McCormick, John G. Reading, Henry R. Wilson, F. Tilford, L. B. Gawtry, C. G. M. Thomas, M. H. Spear and H. L. Snyder. Mr. Spear was appointed Manager, succeeding Mr. James W. Lane, whose record for his term at Williamsport (about 5 years) was quite a creditable one.

AT the annual meeting of the Slatington (Pa.) Gas Company the officers chosen were: Directors, W. L. Jones, Josepn Richards, A. L Kistler, John Taylor, Guy R. Jones, Robert G. Pierce and F. M. Homer; President, Walter L. Jones; Vice-President, A. L. Kistler; Secretary, H. E. Graffen; Treasurer, Joseph Richards.

THE gas plant at Warsaw, N. Y., is out of commission.

THE receiver of the Lehigh-Northampton Gas Company (Mr. W. W. McKee) has determined to reconstruct the Catasauqua plant.

THE Atlantic City (N. J.) Gas Company, is now comfortably installed in its handsome new offices on Michigan avenue.

AT the annual meeting of the Orange (N. J.) Gas Light Company the Directors chosen were: Jerome Taylor, William Scheerer, U. H. McCarter, Thomas N. McCarter, Thomas H. Nevins, E. C. Hay and Adrian Riker.

THE Borough Council of Sea Isle City, N. J., has revoked the gas franchise issued to certain Philadelphia "capitalists" some months ago.

THE Louisville (Ky.) Gas Company has declared its usual semi-annual dividend of 3 per cent.

MR. ALBERT VENSEL, for many years a trusted employee of the Peoples Gas Company of Pittsburg, Pa., died at his home in Wilkinsburg, a suburb of Pittsburg, some days ago. He was in his 55th year.

MR. LEWIS LILLIE has been elected Fourth Vice President of the United Gas Improvement Company, and Mr. W. F. Douthirt has been promoted to the position of Secretary.

THE plant at Fort Collins, Col., is about completed. The chief thing left for finishing is the main system, but the necessary work thereon for completing it will take little time. This plant represents an expenditure of about $45,000. President James B. Arthur is quite enthusiastic over the outlook for business.

AT the annual meeting of the shareholders in the Delaware (O.) Gas Company the officers elected were: Directors, F. P. Hills, H. W. Jones, J. W. Hills, V. T. Hills and T. C. Jones; President and Manager, T. C. Jones; Vice-President, W. Hills; Secretary, John F. Shoub.

A BELATED, but still interesting item, is the following: "Finished in white enamel, from floor to ceiling, the model kitchen which has been fitted out as an adjunct to the exhibit room of the Milwaukee Gas Light Company, 182 Wisconsin street, is a marvel of beauty and cleanliness. In order that a concrete illustration might be furnished of the dignity and wholesomeness with which kitchen work may be invested, no pains have been spared in fitting out the model kitchen. 'Cleanliness' has been the watchword. The room is finished in white and blue. Every inch of the woodwork is white enamel. The walls, instead of being coated with paper, are covered with white oil cloth, figured in blue squares, to harmonize with the general effect. It is therefore easy to wash the walls. To carry out the idea of cleanliness, the utensils are of the simplest sort. They are all of aluminum and Stransky ware. A working table of white enamel has a plate glass top. Above this is a white enamel cabinet, filled with blue and white china jars. This cabinet also contains a wooden shelf, in which are slits for carving knives, etc. The cupboard, also of white enamel, has leaded doors and removable shelves. Expensive glass knobs, which can be easily cleaned, are found on both the cupboard and the cabinet. The model kitchen was planned by and is under the supervision of Miss Olive Blanchard, head demonstrator for the Milwaukee Gas Light Company. Miss A. Thiesenhausen, a demonstrator, assists her."

The Market for Gas Securities.

The net result of the dealings in Consolidated gas for the week was a standoff, as the final quotations—197½ to 198½—to-day (Friday) show. Last week the figures were 197¾ to 198¼. The mix-up over "investigations" of one sort or another continues; but it seems to us that the disposition to summon the controllers of the business of the Consolidated Gas Company, which disposition in the first instance was of a decidedly grouty nature, to tell off-hand what they knew of the Company and its methods is not so strenuous. Our peculiarly constituted District Attorney's methods in putting gamblers on the rack it seems may not be easily followed in determining the status between those who have something of real value to sell and those who wish to purchase that which is for sale. However, the courts will tell.

Brooklyn Union sold at 209 in the week, and the quoted price for it to-day is 204 to 210. Baltimore Consolidated is 84¼ to 85½; Laclede preferred is 90 bid, and Peoples, of Chicago, is 106¾ to 107, despite all the rate bills now before the State Legislature. Washington (D.C.) shows no change.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

January 23.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	197½	198½
Central Union, Bonds, 5's	3,000,000	1,000	108¼	110
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Mutual	3,500,000	100	300	320
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co..				
Bonds, 5's	11,000,000	1,000	112	113¼
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	85	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's.	1,250,000	1,000	104	106
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	112	114
" 1st Con. 5's	1,500,000	..	106¼	108½
Standard	5,000,000	100	125	130
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	204	210
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	—	—
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	5¾
" " Bonds, 5's	5,250,000	1,000	66	68½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	107½	108
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	97½	90
Columbus (O.) Gas Lt. & Heating Co	1,682,780	100	88¾	89¼
Preferred	3,026,500	100	107½	109
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	84¾	85½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	89½	92
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	381,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	104¼	105½
" Bonds, 5's	10,500,000	..	107	108
Indianapolis	3,000,000	..	70	75
" Bonds, 6's	2,650,000	..	106½	108
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	90	105
Bonds	10,000,000	1,000	108½	109
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	138	140
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	106¾	107
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	94	96
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	113½	115
General Mortgage, 5's	2,465,000	1,000	92	93

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National Paint Works, New York City..... 152

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 140

Position Wanted.

A man having 13 years' experience in all lines of the gas business wishes to obtain the management of a plant operating in a place of 10,000 or 15,000 inhabitants. Prefer a position needing energetic effort to secure results. Am not afraid of work. Can give references from former employers. Address, "P. R.,"
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By a man who thoroughly understands the manufacture of water and coal gas, either large or small plants. Has had the best of training in both. Would like position of superintendent in a city of 15,000 or over, or would accept position as general foreman in a large works. Can get results and consumers and hold them. Excellent reference letters from last employers. Address, "G. H. R.,"
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In a Western city of 25,000 inhabitants. Must be competent and reliable. Salary to the right man, $1,800 per year. Address, with references,
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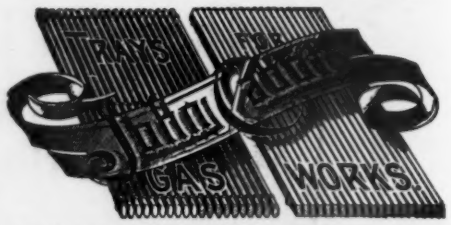

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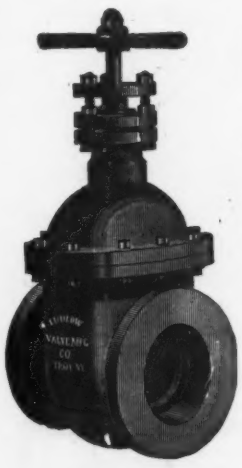

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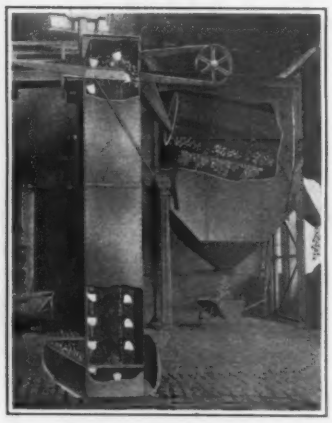

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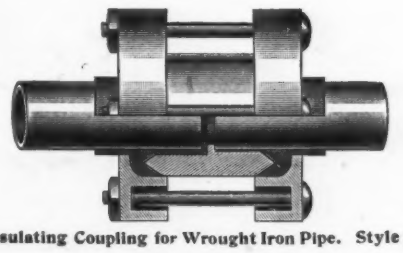
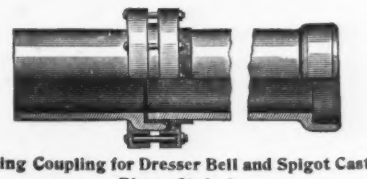


Insulating Coupling for Wrought Iron Pipe. Style 5.



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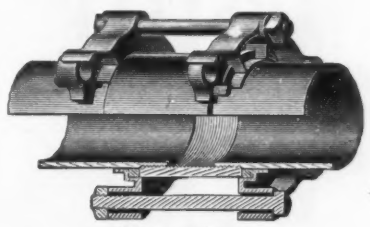
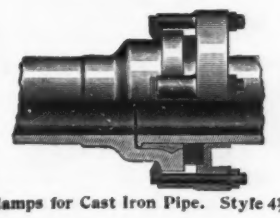


Clamp. Style 4.



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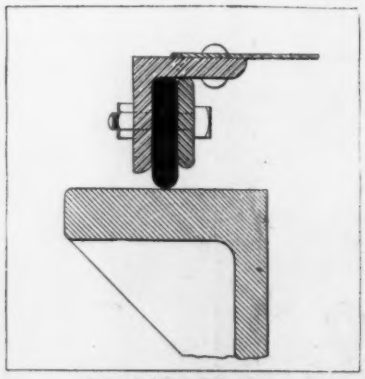

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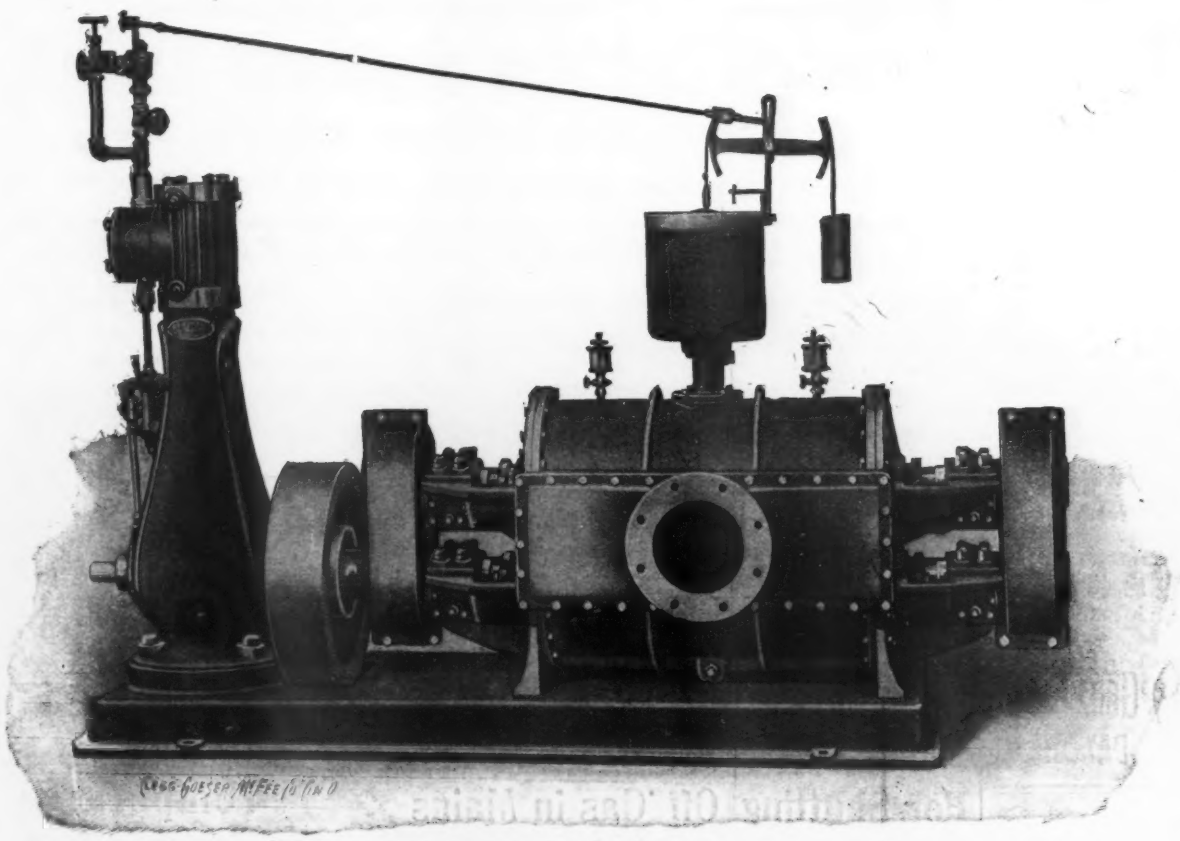

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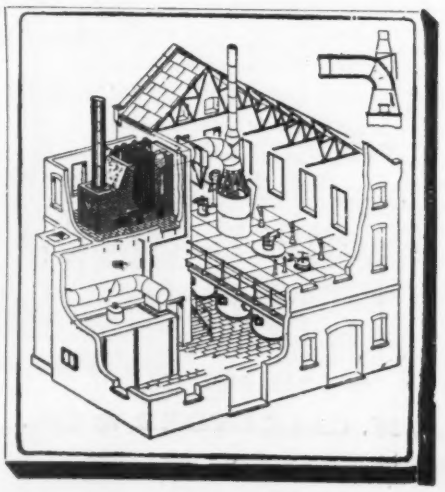

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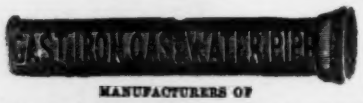

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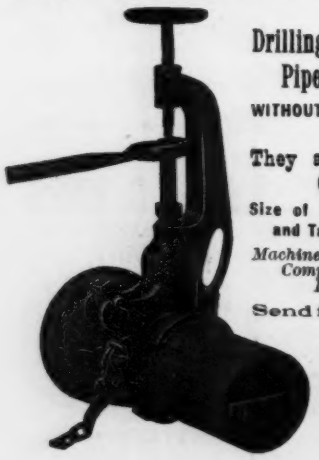

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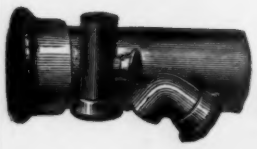

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AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

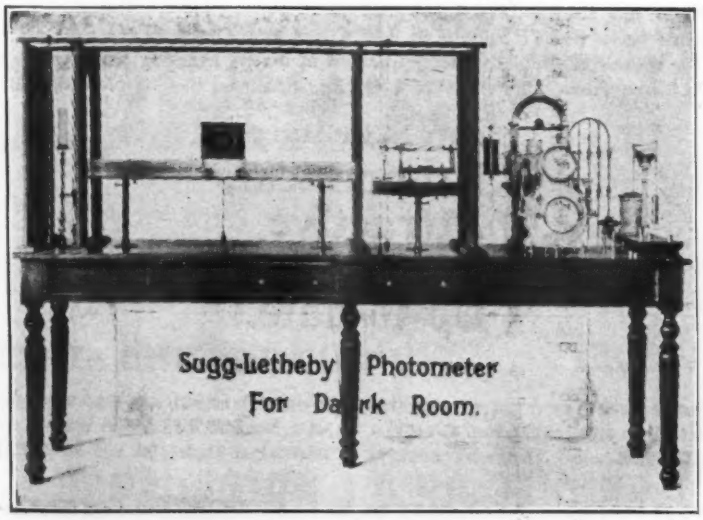
FEBRUARY, 1905.

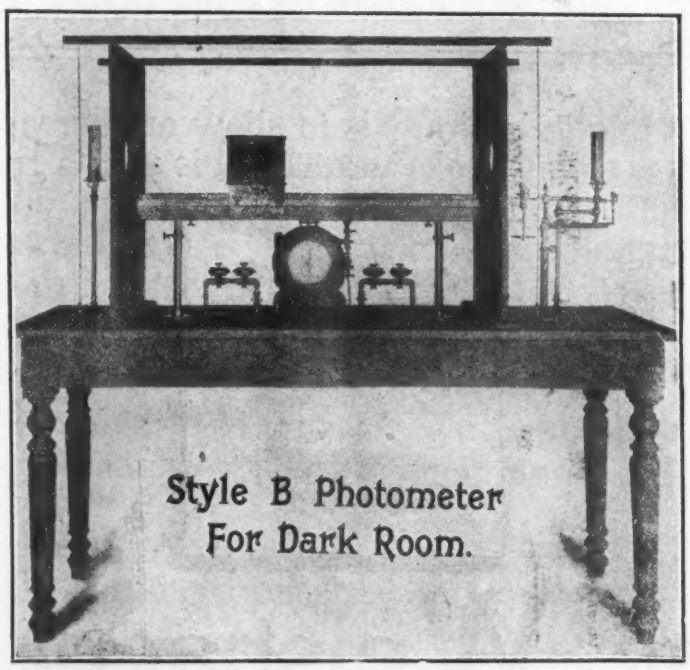
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Extinguish.
Wed.	1	5.50 PM	6.10 AM
Thu.	2	5.50	6.10
Fri.	3	5.50 NM	6.10
Sat.	4	5.50	6.10
Sun.	5	5.50	6.00
Mon.	6	5.50	6.00
Tue.	7	5.50	6.00
Wed.	8	8.30	6.00
Thu.	9	9.30	6.00
Fri.	10	10.30	6.00
Sat.	11	11.20	6.00
Sun.	12	12.20 AM FQ	5.50
Mon.	13	1.20	5.50
Tue.	14	2.10	5.50
Wed.	15	3.10	5.50
Thu.	16	4.00	5.50
Fri.	17	4.50	5.50
Sat.	18	No L.	No L.
Sun.	19	No L. FM	No L.
Mon.	20	No L.	No L.
Tue.	21	6.10 PM	9.10 PM
Wed.	22	6.10	10.30
Thu.	23	6.10	11.40
Fri.	24	6.10	12.40 AM
Sat.	25	6.10 LQ	1.50
Sun.	26	6.20	2.50
Mon.	27	6.20	3.40
Tue.	28	6.20	4.40

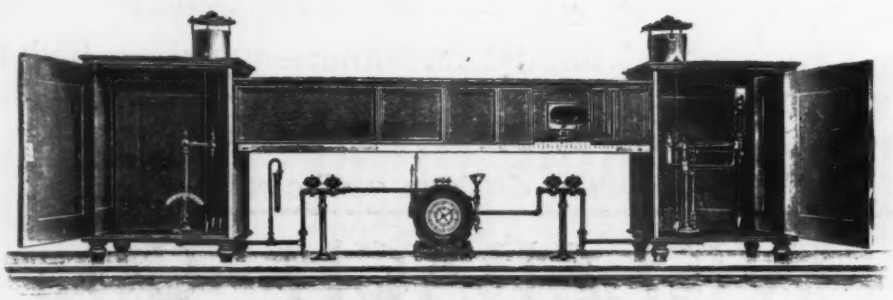
TOTAL HOURS DURING 1905.

By Table No. 1.

	Hrs.Min.
January	240.50
February	192.20
March	207.00
April	175.10
May	161.00
June	139.50
July	149.00
August	161.50
September	173.00
October	205.00
November	211.00
December	229.00
Total, yr.	2245.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

FEBRUARY, 1905.

Day of Week.	Date.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
		A.M.	P.M.
Wed.	1	5.05	6.15
Thu.	2	5.05	6.15
Fri.	3	5.05	6.15
Sat.	4	5.05	6.15
Sun.	5	5.10	6.10
Mon.	6	5.10	6.10
Tue.	7	5.10	6.10
Wed.	8	5.10	6.10
Thu.	9	5.10	6.10
Fri.	10	5.10	6.10
Sat.	11	5.10	6.10
Sun.	12	5.20	5.55
Mon.	13	5.20	5.55
Tue.	14	5.20	5.55
Wed.	15	5.20	5.55
Thu.	16	5.20	5.55
Fri.	17	5.20	5.55
Sat.	18	5.20	5.55
Sun.	19	5.30	5.55
Mon.	20	5.30	5.55
Tue.	21	5.30	5.55
Wed.	22	5.30	5.55
Thu.	23	5.30	5.55
Fri.	24	5.30	5.55
Sat.	25	5.30	5.55
Sun.	26	5.30	5.45
Mon.	27	5.30	5.45
Tue.	28	5.30	5.45

TOTAL HOURS DURING 1905.

By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 97 Liberty Street. BOSTON. 814 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, Foot of Orleans Street. SAN FRANCISCO, 712 Polk Street.

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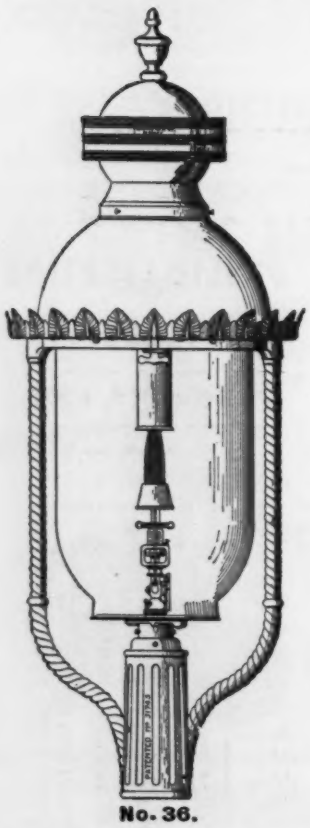
.... OF AMERICA ....



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Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

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Brooklyn, N. Y. (4th contract).
Cincinnati, O. (2d contract).
Scranton, Pa. (3d contract).
New York City (14th contract).
New Haven Conn. (2d contract).
Watertown, N. Y.
Tampa, Fla. (3d contract).
Westchester, N. Y. (3d contract).
Bridgeport, Conn. (2d contract).
St. Paul, Minn. (2d contract).
Harrisburg, Pa.
Pelham, N. Y.
Reading, Pa.
Springfield, Mass. (2d contract).
Lynn, Mass. (5th contract).

TOTAL SETS, 1904, ... 35
TOTAL DAILY CAPACITY, 1904, . . 50,400,000 cubic feet.
TOTAL SETS TO DATE, ... 543
TOTAL DAILY CAPACITY, . . . 413,180,000 cubic feet.

The United Gas Improvement Company,

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Established 1858. Incorporated 1890.
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Fire Brick, Tiles, Etc.

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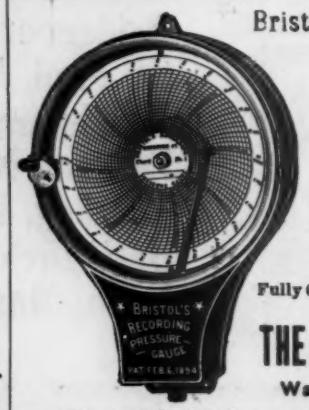

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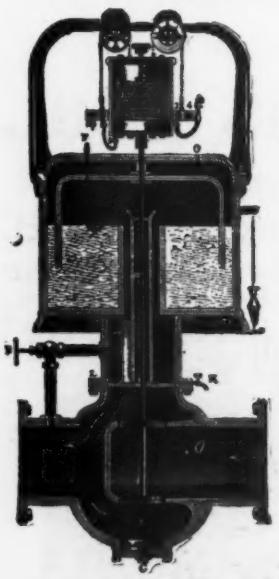

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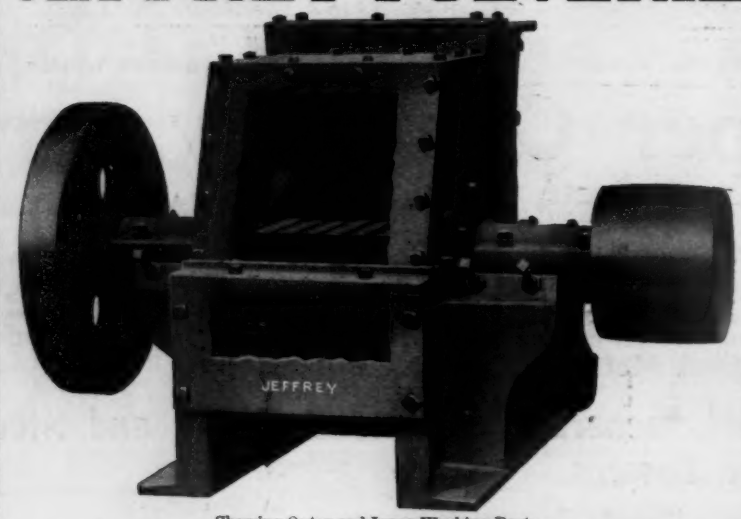

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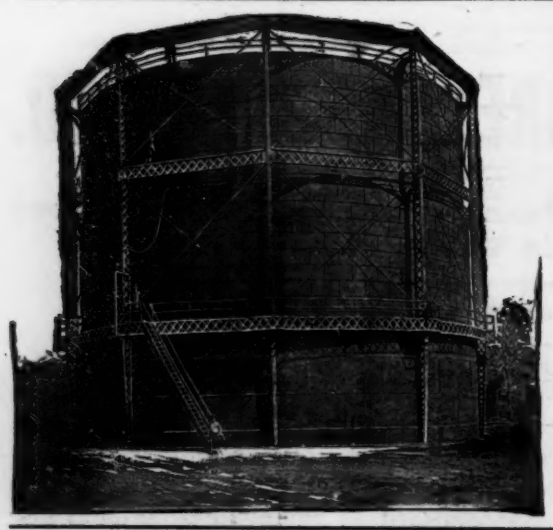

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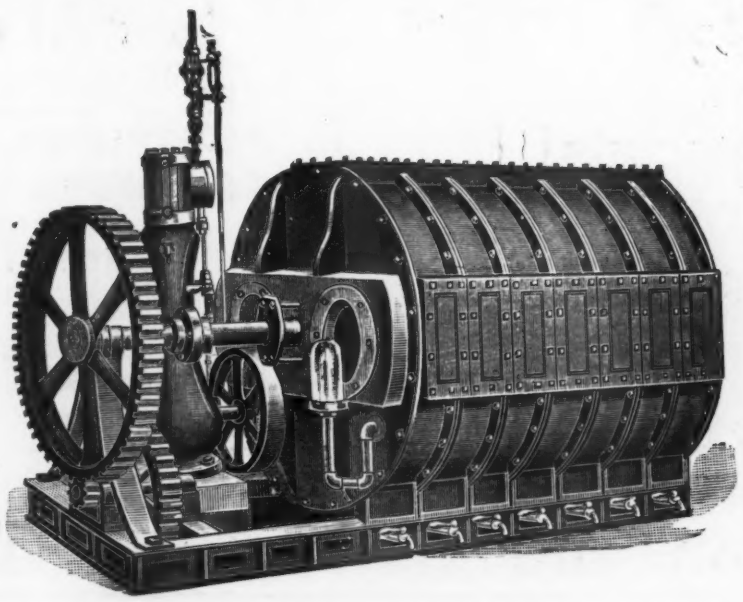

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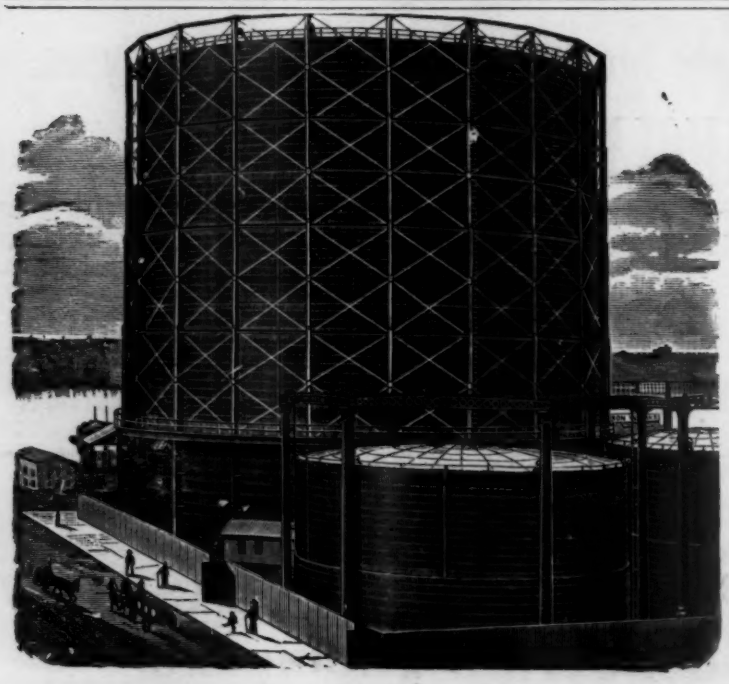

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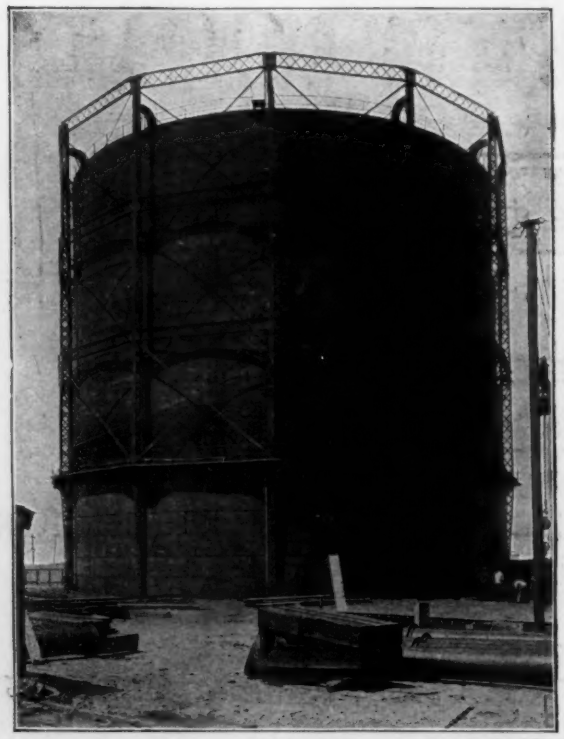

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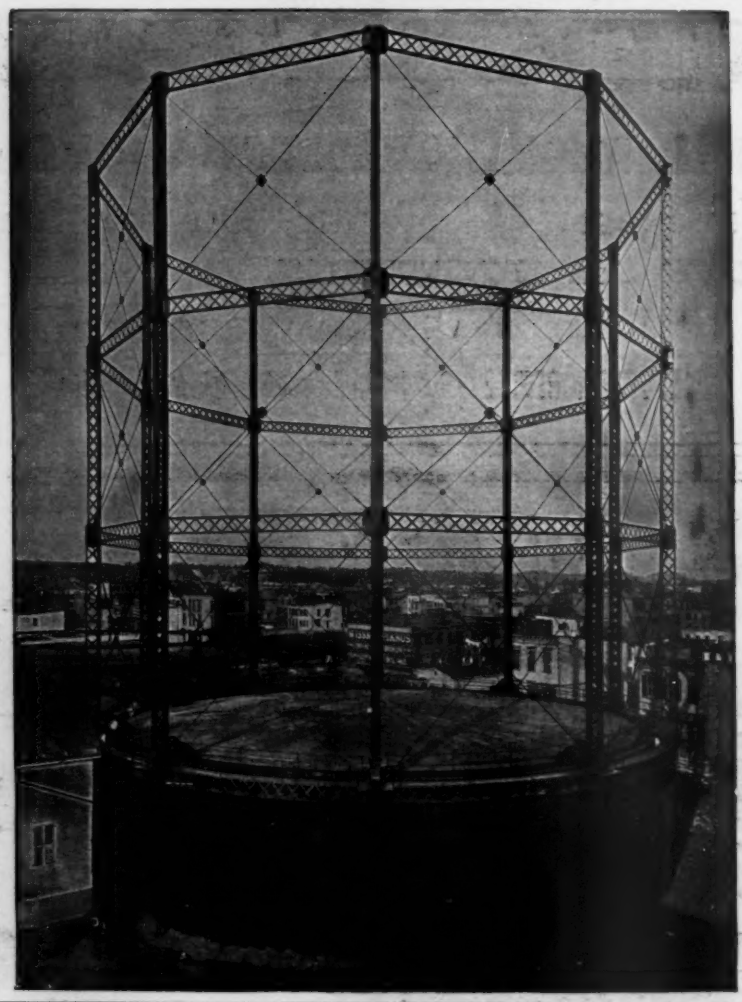

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